

**A Study on the Environmental Concerns through
Environmental Information Management and it's
impact on building public awareness in sensitive zones
of Karnataka.**

Thesis submitted for the degree of Doctor of Philosophy at
Kannada University, Vidyaranya, Hampi

By

KALYANI, V.

Guide

Dr. T.S. CHANNESH,

Research Director

Mount Carmel Centre for Scientific Research

& Advanced Learning

Mount Carmel College

Palace Road Bangalore – 560 052



Department of History of Sciences
KANNADA UNIVERSITY, HAMPI
VIDYARANYA-583 276

2005

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AKSHARA GRANTHALAYA



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Environmental Information Systems and its
Impact on Building Public Awareness in Schools
- Study of Bangkok -

For submission to the School of Public Health
Mahidol University, Bangkok

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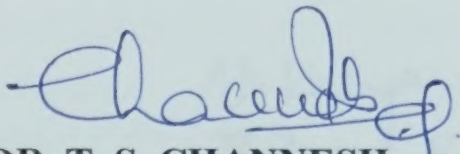
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CERTIFICATE

I hereby certify that the thesis entitled "A Study on the Environmental Concerns through Environmental Information Management and its impact on building public awareness in sensitive zones of Karnataka" by Kalyani, V. for the fulfillment of the award of Ph.D., degree under the Department of History of Sciences is based on the investigation carried out by her under my supervision. This thesis or part there of does not form part of any other submission of any degree or diploma.


DR. T. S. CHANNESH

Date: 15. April 2005

Place: Bangalore

DECLARATION

I hereby declare that the thesis entitled “A Study on the Environmental Concerns through Environmental Information Management and it's impact on building public awareness in sensitive zones of Karnataka” is submitted to the Kannada University, Hampi towards the fulfillment of **Ph.D. Degree under the Department of History of Sciences**. This work is based on the field Investigation and prepared under the guidance of **Dr. T.S. Channesh**. This thesis or a part thereof has not been submitted previously for any other degree.

V. Kalyani
Kalyani, V.

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INTRODUCTION

I. INTRODUCTION

The Earth is our home
How we care for ourselves
Is how we care for the Earth.
Every step we take determines
Our future, our children and
Future generations,
May we walk with Wisdom

Environment in the past was afflicted with slavery under foreign rule; and human beings carried out their activities without exercising their wisdom. Independence brought in an urge, to be self-reliant and necessitated human beings to use their wisdom in activities. In the last five decades, living has been beset with constraints. Nature and environment have been relegated by technological intrusions and dependence on capsule form of decisions. Nevertheless, times have changed. People have come to realize the importance of the role of environment even on our day-to-day activities, and the potential power of wisdom is being changed to kinetic. The present and future generations have a major role to play in the optimal use of the God given wisdom, and should shoulder the responsibility to safeguard the interest of the future.

Man is modifying the ecosystem, which will produce a new situation that will have a strong bearing on man himself. In shaping his environment man is in fact shaping his own future. We should remember that environment and development is one because the progress depends on preserving the environment that provides the necessary resources for development. The simplest definition of conservation is that it is the 'wise and wide use of resources'. That is, we carefully use the resources, which are at our disposal

today, so that they are not unnecessarily depleted, thus precluding future generations from their opportunity to use and enjoy them.

The wisdom in the civilized world is attained by the collective experience of many and by addition of facts with thoughtful efforts. Knowledge has grown with the evolution and civilization. All around us the world is changing faster than ever before. The principle driving force behind these changes is technology, technology that is now moving the world from an age of industry into one of information.

Using natural principles in model building, efforts have become sources of information. In modern times, information *per se* has been discussed and dialogued with the aid of the computation language. Traditionally, information was through oral communication, thus restricting it to a few people and few areas. Technological innovation and rapid economic growth necessitated information explosion to all—people and sectors. This was possible through the emergence of IT (Information Technology), served by Internet facility.

In olden days, knowledge dissemination was through lullabies, stories, fairy tales, proverbs etc. This helped in people knowing about the impact of environment and caring for Mother Earth. The wisdom of love and conservation of natural resources were passed on orally from generation to generation. Otherwise, Rachel Carson's book *Silent Spring* wouldn't have created so much voice and also provided so much strength to our environmental activists. Virtually it created a history of awareness or consciousness towards the environment as early as 1960s. Later on, the

environment related aspects have been taken up by many and started towards the conservation of earth and its natural resources.

It was during 1972 - the first conference on environment and development – the United Nations Conference on human development at Stockholm was organized and then onwards, the global community has increasingly focused on environmental protection and its relationship with economic development. It had virtually given a platform to relate development and environment. There on, the economy has embedded with the environment. The concerns so developed and initiated gave the real feel of nature.

After two decades, the major shaping of environmental concerns happened due to RIO SUMMIT held at Brazil in 1992. Afterwards, several meetings and discussions took place and have helped in the process of building awareness for environmental conservation. This summit made a special impact on the countries, which had responsibilities on saving and exploiting the environment. Pressure on such countries has become imperative. The convention on biological diversity and its Agenda 21 became globally possible to save the diversity and the environment. Majority of the countries, through their governmental representatives agreed upon the agenda and pledged towards the conservation. This perhaps must have been the most popular world meet in the conscious interest of the nations. The real boost of hope on conservation and protection of earth was ensured by this summit. The information on environment and the access to such issues to public was also made possible due to the provisions of international agreements.

Genesis of the study:

Concerns about the environment of different countries, province etc and understanding of its importance in the developmental efforts of the locality, has increasingly engaged the attention of Governments, NGO's, institutions and people in general. This could be the possible effect of availability of databases on environmental information.

Studies have been initiated during the days between 1970 and 1990s and many attempts are made through environment research at various institutions. They had initiated studies on different directions, considering location, time, biological sensitivity habitat etc. Historically, environment research has been conducted as small scale studies, involving one or few investigators in a single discipline for relatively short period. Recently, increased understanding of small scale environmental patterns and processes coupled with landscape, regional and global patterns and processes has led to the development of studies addressing broad scale, long term questions (Eg. long term environmental and ecological programmes initiated by different institutions in different countries). Perhaps this has made tremendous impact of people on nature. After realization of the impact on environmental issues the resource management concept has entered the classical use of resources. The movement has given opportunity for the alternatives in understanding the nature also.

With this, a new dynamics between science and technology is changing the management and analysis of environmental information. As a result of the expanding scope of environmental research, developers of environmental databases must now address difficult and diverse issues; the wide variety of data

being considered for inclusion; the size and complexity of databases; their design, development and utilization; and the integration of data from various sources and disciplines; above all a perception and awareness building for conservation of resources amongst people.

The many groups marching under the environmental banner have grown in number, sophistication and aggressiveness throughout the 1980s and it is designated as the Environmental Movement. The environmental movement prospers without a single orthodoxy. Viewed at close range, the movement dissolves into many different organizations with diverse policy agendas, political strategies and membership credos- a reminder that pluralism and conflicts born of pluralism is common within environmentalist ranks.

No simple and sovereign explanation for the nation's continuing environmental problems will suffice. Most ecological ills are the product of several factors in different and often interacting combinations. Many states for instance; lack the technical resources to develop numerical standards. Economic growth and population expansion often diminish the effectiveness of pollution control. Continuing scientific and technical innovations also contribute to environmental problems by creating new substances or technologies with potentially serious environmental risks. Difficulties in environmental protection often arise from limited understanding of the causes and consequences of ecological degradation. Existing data on environmental quality are often scarce; environmental monitoring is often undervalued and under funded. Data collection has only begun in some experimental domains. Time may also change scientific understanding of older environmental problems. Moreover, with the recent discoveries of acid rain and global ozone depletion demonstrate, nature can surprise science but no doubt such recent

environmental discoveries will soon become yesterday's news in the face of newer ecological discoveries. It has taken time for environmental scientists to comprehend the global scale of ecological processes and to educate policy makers into perceiving national problems in a world context.

In short, almost every significant environmental problem is fixed in a matrix of ecological, economic, political and scientific cause and consequence that usually frustrate quick and simple solutions. Thus, the status of the nation's environment and its commitment to environmental protection and preservation is deeply troubling and sometimes alarming. This has been the rise of environmentalism, directed towards the initiation of studies on documentation and analysis of the information generated or collected. The resultant effect has led to the formation of institutions and associations wherein each institute/association have had their mandates on saving of the Earth and its environment. These organizations collect, generate and disseminate information on environmental issues to the aspirants.

Such organizations across the globe are many and have been operating since 1970s. A general code of ethics of these associations includes: Evaluating and controlling the potential environmental risk and environmental health hazards due to the impact on both quality and expectancy of people.

Several associations for environmental information are formed and they hold certain responsibilities. Those responsibilities include:

- Hold paramount the safety, health and welfare of the public
- Perform services only in areas of their competence.
- Issue public statements only in an objective and truthful manner.

- Act in a professional manner for each employer or client as agents or trustees and avoid conflicts of interest
- Build their professional reputation on the merit of their services and not compete unfairly with others.
- Act in such manner as to uphold and enhance the honor, integrity and dignity of the membership.
- Continually strive to enhance the development of safe, effective environmental evaluation and control techniques
- Continue their professional development and encourage the professional development of those they supervise.
- Promote the education of the public concerning safe and acceptable means by which environmental management should be handled.

Such responsibilities created some specific environmental information or topics for the interest of environmental organizations. These included:

- Directories
- Research Programmes/Projects
- Environmental computer models
- Environmental education Resources
- Newsletters, Journals
- Environmental Law
- Biodiversity
- Air quality/Pollution
- Ozone depletion and global warming
- Environmental Education Resources
- Special topics pertains to local interest

There is a wealth of information about environmental issues that can be accessed via Internet. There is an abundance of information and associations for surfing on the web. It may be interesting to note that in a fraction of

second the search engine could provide the first 1-10 webs or the most referred 10 webs out of few 100 millions. This is due to the information network. However, most of the information may be repetitive and may not be fully accessible, but the abundance is really astonishing.

The following are the details of results that were obtained (as on April 2005) on Yahoo search Engine

The word **environment**, under yahoo search gives around **213 million** search results, in **0.07 sec**.

Given more specifically, the word **Environment Information** search gives around **126 million** results, in **0.13 sec**.

Further extended search of the word **Environment Information Management**, gives about **72.5 million** results in 0.14 sec.

This led to the instinct of exploring the impact of information in Karnataka, which has a host of one of the 18-mega diversities of the world, one being the Western Ghat. Thus the study area is located in Western Ghat. This is the most ecological sensitive area in Karnataka where several environmental movements have been taken very seriously.

Scope of the present study:

A range of hills starting in the Southern portion of Gujarat around Dangs district and the territory of Nagar-Haveli and Dadra runs almost parallel to the Arabian Coast in the Deccan peninsula right down to KanyaKumari district in Tamilnadu and is termed as Western Ghats. These hills vary in height from about 200m to 300m. The Western Ghats has scenic spots in the

tremendous cataracts virgin forests and a variety of wild lives. The traditional agriculture and horticulture in the Western Ghats tract has depended heavily on the availability of green leaf manure, dry leaf mulch and burning of dry leaf and branch material as raab for sustaining productivity. The Western Ghats has many wild relatives of cultivated plants and a number of indigenous races of cultivated crops and domesticated animals.

The Western Ghats is currently the biogeography province of focus in the context of biodiversity inventorying and management. In case of Western Ghats, which is known for its species, richness creates a wide array of habitats that support the unique set of both plant and animal species. Under each tree there will be co-existing plants, which will have mutual interaction between them to some extent. The existence of the co-existing plant under the trees depends on various environmental factors and also the soil properties.

The Western Ghats is globally recognized for its bio-diversity, species richness. Nearly 2000 species of higher plants, 84 species of fishes, 87 species of amphibians, 89 species of reptiles, 15 species of birds and 12 species of mammals are endemic to the Western Ghats (Ranjit Daniels, 1997). Western Ghat is richly endowed with floral, faunal and habitat diversity. The biological wealth of the Western Ghats has been rapidly declining in recent decades with a diminution in the area occupied by natural biological communities in even tinier fragments. Uncertainties exist in the taxonomy at various levels in the Western Ghat bio-diversity (Madhav Gadgil, 1983-84).

The area chosen, host many biota and place of important catchment for important rivers of the state. All the rivers either run eastwards or westwards of

the Western Ghats. Most of the rivers originate from this area. The most important evergreen rain forest of the state is fully under this area, making it the most sensitive part of the state. During the last two decades, much of the attention on Western Ghats and biodiversity of the state has been concentrated due to the location. Entire environmental concerns was evolved due to this place or originated in this place.

Environmental movement and related activities were notably initiated here. The vegetation, water sources, fauna and other biologically important aspects have added its strength to be as sensitive and conscious. Much of information that has been generated regarding this site, made people to be environmentally aware and concerned to the issues. River Tunga and its catchments made their tremendous impact due to the public awareness and involvement. Many successful discussions among the public led rallies and awareness campaigns have made the significant remark in environmental history of the state.

The kind of awareness and concerns were generally seen from the documentations and in the changes in perception of people including academics. Earlier, people who used to hesitate to discuss the environmental dialogs, today have an exclusive department for environmental science.

Even governments have initiated ministries for the environment and ecology. Perhaps most significant in this regard could be the constitutional view of environment and ecology. Hence the environment law has been viewed and legal versions started redefining the related laws.

Extent of the study

With this interest, (the present study was taken up to give an insight into the issues that govern the information genesis and management, with the concerns of environmental conservation. The study had the wide extent of interdisciplinary association of different fields. It analyses the historical issues towards research orientation of the information and environment linkages. The present study embraces the evolution of concerns and the public opinion possibility in environmental information. It discusses the options of natural resources management by the people of the study area and their demographic features were correlated.)

(The present study has been done to give an insight into the issues that govern the information genesis as well as management with the concerns of environmental conservation.)

A well-known phrase: think globally and act locally - reminded and oriented the study in generating the local specific application with a proper understanding of the global possibilities. While setting the local goals, the over all interest of the globe was kept as the priority, with out neglecting the immediate local interests.

Hence in this connection, the realities in Karnataka are explored to under stand the evolution of environmental movements and ecological concerns for conservation of the environment for future benefits. With this, the present study has the following objectives

Objectives:

1. To study the role of Environmental information on evolution of environmental concerns.
2. To study the Research perspective of environmental studies in Karnataka.
3. To study the Historical perspective of environmental studies in Karnataka.
4. To study the implications of new technological regime on environmental information management studies in Karnataka.
5. To evaluate the concerns by environmental auditing in sensitive areas through case studies.)

REVIEW OF LITERATURE

II. REVIEW OF LITERATURE

Several scholars have contributed intellectually towards the information management and environmental awareness. The documented literature pertaining to the study has been carefully reviewed and classified to the requirement and analysis of the study approach. It was observed that, the empirical studies on certain issues relating to certain sensitive areas such as western ghat etc., were plenty in number. Since the research articles, directly pertaining to environmental information management, were scarce, direct linkage between information and consciousness was also less. Hence many indirect linkages were found and are taken as the tool for the review. The related articles from the documented literature were reviewed and are presented under the following subheadings.

2.1 Evolution of Environmental Concerns

2.2 Information Management

2.3 Environmental Information

2.4 Environmental Awareness

2.5 Karnataka Environmental information Status

2.1 Evolution of Environmental Concerns

It was Rachel Carson who awakened the public for the first time in the history of documentation on environmental issues, through her famous book *The Silent Spring*. This initiated the rise of environmentalism. Rachel Carson's *Silent Spring* is widely recognized as one of the most influential books

of the 20th century. Its publication in 1962 generated a chain of events that permanently altered conventional public perceptions about pesticides. It led to a ban on the use of chemicals like DDT in the United States of America and inspired the setting up of the US Environment Protection Agency (EPA). Carson's was the first in signaling the result of unleashing a wide array of lethal chemicals in agricultural fields, led to a chain of ecological imbalances in natural populations. Probably no other book on the environment in the 20th century had as much impact on public consciousness as *Silent Spring*. It inaugurated the environment movement. Consequently, movements were evolved by public awareness. Concerns about the environment of different countries, province etc. and understanding its importance in the locality has increasingly engaged the attention of Governments, NGO's, institutions and people in general. Several attempts are being made through environment research at various institutions in different directions, considering location, time, biological sensitivity, habitat etc (Rachel Carson, 1962).

When the first environmental era began during 70s, virtually no one was confident that environmentalism could survive the ferocious competitive pluralism. Environmentalism was frequently dismissed as another trendy and transient public preoccupation. Now, the voices and events from two decades of vigorous environmentalism resonate through (Rosenbum 1990).

The worldwide explosion of environmental concern in the 1970s and a recurrence in the late 1980s did not occur without causes and antecedents, which influenced the substance and direction of international action. It legitimized environmental policy as a universal concern among nations, and so created a place for environmental issues on many national agendas where they had been previously unrecognized (Lynton, 1972).

The United Nations Conference on Human Environment marked the culmination of efforts to place the protection of the biosphere on the official agenda of international policy and law. Specific aspects of the environment, protection of the earth as a whole did not gain political recognition preceding the Stockholm Conference. Stockholm facilitated means towards international action previously limited by inadequate perception of environmental issues and by restrictive concepts of national sovereignty and international interest. In effect, nation-states joined together their sovereignty and jurisdiction to resolve collectively issues that previously would have been definable only within the limits of particular national jurisdictions (Thomas, 1972).

Establishment of the United Nations Environment Programme and Environment Fund was indispensable to a productive consequence of the Stockholm Conference. The Stockholm Conference proposed a special body within the UN Secretariat to stimulate, assist, and coordinate the international protective efforts. This institution, established by resolution of the General Assembly, was the United Nations Environment Programme (UNEP), (Jon Mclin., 1972).

On 5th June 1972, after more than two years of extensive preparations, the United Nations Conference on the Human Environment opened its first plenary session at the Royal Opera House in Stockholm. The United Nations Conference on the Human Environment, which met in Stockholm in 1972, legitimized environmental policy as a universal concern among nations and so created a place for environmental issues on national agendas where they had been previously unrecognized (Hans, 1972).

At the international conference on the Human Environment, a dialogue on protection of environment began. The concept of sustainable development and Development without destruction evolved. Thus, the Stockholm conference in 1972 explained the imperative goal for mankind to defend and improve the human environment for present and future generations. The principal accomplishments of the Stockholm Conference were two fold: the official recognition of the environment as a subject of general international concern and the institutionalization of that concept in the United Nations Environment Programme (UNEP) (Norman, 1979).

The United Nations Conference on the Human Environment differed from other United Nations Conferences in its initiation of a sequence of positive measures that have translated published resolutions into actual accomplishments. This positive outcome has been the principal distinguishing feature of the Stockholm Conference (Lynton, 1984).

Environmental concerns came into sharper focus during RIO summit held in 1992. Since then, there have been diverse changes and far reaching technological developments, with environmental concerns occupying center stage in developed and developing countries. In 1989, the General Assembly of the United Nations by Resolution, voted to accept an invitation from the government of Brazil to hold a major conference on environment and development in that country in 1992. The theme and focus of this conference had already been set by the report of the World Commission on Environment and Development (Brundtland Commission). The prospects of this conference signifies a change in attitude in Brazil, which twenty years earlier at the

Stockholm Conference had led the opposition to international environmental restrictions. This conference was to determine whether the nations of the world were prepared to seriously address the human environmental predicament (News Digest., 1989).

The Rio Summit in 1992 was the first big attempt to address global environmental challenges. The nations of the world came together in Rio de Janeiro in June 1992 at the United Nations Conference on Environment and Development (UNCED) – dubbed the Earth Summit – to try to reach consensus on the best way to slow down, halt and eventually reverse ongoing environmental deterioration.

The Summit represented the culmination of two decades of development in the study of environmental issues, initiated at the United Nations Conference on the Human Environment held in Stockholm in 1972. Stockholm was the first conference to draw worldwide public attention to the immensity of environmental problems and because of that it has been credited with ushering in the modern era in environmental studies (Haas et. al., 1992).

The immediate impact of Stockholm Conference was not sustained for long. Development issues were included in the Stockholm conference in 1972, but they were clearly of secondary importance at that time. The details of the most discussed earth summit messages are the following: Box 1 and 2.

Box -1

Title of the conference:	United Nations Conference on Environment and Development (UNCED),
Place of the organization	: Rio de Janeiro of Brazil
Date of the conference :	3-14 June 1992
Informal name	: The Earth Summit
No of Govts. participated	: 172 (108 at level of heads of Government)
Principal themes -	: Environment and sustainable development
NGO Representation	: Some 2,400 representatives of non-governmental organizations (NGOs); 17,000 people attended the parallel NGO Forum
Resulting Document	: Agenda 21, the Rio Declaration on Environment and Development, the Statement of Forest Principles, the United Nations Framework Convention on Climate Change and the United Nations Convention on Biological Diversity

Box - 2

The Summit's message — that nothing less than a transformation of our attitudes and behavior would bring about the necessary changes — was transmitted by almost 10,000 on-site journalists and heard by millions around the world. The message reflected the complexity of the problems facing us: that poverty as well as excessive consumption by affluent populations place damaging stress on the environment. Governments recognized the need to redirect international and national plans and policies to ensure that all economic decisions fully took into account any environmental impact. And the message has produced results, making eco-efficiency a guiding principle for business and governments alike.

- Patterns of production — particularly the production of toxic components, such as lead in gasoline, or poisonous waste — are being scrutinized in a systematic manner by the UN and Governments alike;
- Alternative sources of energy are being sought to replace the use of fossil fuels which are linked to global climate change;
- New reliance on public transportation systems is being emphasized in order to reduce vehicle emissions, congestion in cities and the health problems caused by polluted air and smog;
- There is much greater awareness of and concern over the growing scarcity of water.

The Earth Summit Agreements are the following:

In Rio, Governments — 108 represented by heads of State or Government — adopted three major agreements aimed at changing the traditional approach to development:

- Agenda 21 — a comprehensive programme of action for global action in all areas of sustainable development;
- The Rio Declaration on Environment and Development — a series of principles defining the rights and responsibilities of States;
- The Statement of Forest Principles — a set of principles to underlie the sustainable management of forests worldwide.

In addition, two legally binding Conventions aimed at preventing global climate change and the eradication of the diversity of biological species were opened for signature at the Summit, giving high profile to these efforts:

The United Nations Framework Convention on Climate Change
and

The Convention on Biological Diversity

Smith (1992) quotes, membership in environmental organizations in 1960s declined slowly and by the late 1970s the environment was seen by many as a dead issue. In the 1980s however, there was a remarkable resurgence of interest in environmental issues. Most of the issues were not entirely new. Acid rain, the enhanced green house effect, atmospheric turbidity, ozone depletion etc had their immediate roots in the environmental concerns of the

1960s, although the first two had already been recognized as potential problems in the 19th century. Drought and famine were problems of even longer standing (David, 1994).

Park (1997) quotes, the seeds for the Earth Summit, was sown in Stockholm in 1972, where the United Nations held the first international Conference on the Environment. One outcome of the Stockholm meeting was the establishment of the United Nations Environment Programme (UNEP) to spearhead international initiatives designed to protect the environment. Development issues were included in the Stockholm in 1972, but they were clearly of secondary importance at that time well behind all the environmental issues discussed. Several years later the United Nations, appointed a World Commission on Environment and Development – commonly called the Bruntland Commission after its Chairwomen, Gro Harlem Bruntland – that firmly combined economy and environment through its promotion of 'sustainable development', a concept which required development to be both economically and environmentally sound so that the needs of the world's current population could be met without jeopardizing those of future generations. The Bruntland Commission also proposed a major international conference to deal with such issues. This led to the Earth Summit at Rio in 1992 and its parallel conference of non-governmental organizations (NGOs).

(Mukundan, 2002) reported that the outcome of Rio-Earth Summit (1992) highlights the view that socio-economic development and environment protection are interdependent and mutually reinforcing processes. In the years that followed, it also came to be recognized that regional or local environmental problems, such as extensive urbanization, deforestation,

desertification, and general natural resource scarcity, could spread to pose serious repercussions for broader international security. International recognition of the fact that environmental protection and natural resources management must be integrated with socio-economic issues of poverty and underdevelopment culminated in the 1992 Earth Summit.

Sunita Narain (2002) quotes, the agenda at Rio was dictated by the developed countries and was therefore, one-sided. At Johannesburg, concerns of the poor must come first if we are to build a caring and sharing world.

The World Summit on Sustainable development was organized in September 2002 in Johannesburg, South Africa. World governments, concerned citizens, UN agencies, multilateral financial institutions, and other major groups were participated and assess global change since the United Nations Conference on Environment and Development (UNCED) in 1992.

Some details of the Johannesburg summit are given in Box-3.

Box –3

JOHANNESBURG SUMMIT 2002

Johannesburg Summit 2002 – the World Summit on Sustainable Development – brought together tens of thousands of participants, including heads of State and Government, national delegates and leaders from non-governmental organizations (NGOs), businesses and other major groups to focus the world's attention and direct action toward meeting difficult challenges, including improving people's lives and conserving our natural resources in a world that is growing in population, with ever-increasing demands for food, water, shelter, sanitation, energy, health services and economic security.

The environmental movements affect public opinion in other significant ways. Perhaps most important, it has educated the public about the environmental problems facing the country. Less than twenty years ago, ecology and environment were issues foreign to almost all. Today we have a rudimentary understanding of some basic ecological precepts, including the limits of global resources. Before the 1960s, most environmental groups were concerned primarily with land and wildlife management, not air or water pollution or hazardous waste (Samuel P. Hays, 1959). Their vision was nearsighted, focused mostly upon domestic issues and their science was unsophisticated in its lack of sensitivity to the complex interrelationships among environmental problems. By the 1980s, viewpoints were becoming more global, ecologically informed and expansive in defining environmental problems. In 1959, for instance, the Defenders of Wildlife were concerned with individual animals, not survival of species and with mistreatment of zoo animals. Today, the organization stresses, among other issues, worldwide protection of wildlife habitat and protection of endangered species (Henry P. C., 1980).

Concerns about the environment of different countries, province etc and understanding of its importance in the developmental efforts of the locality, has increasingly engaged the attention of Governments, NGO's, institutions and people in general. This could be the possible effect of availability of databases on environmental information. Environmental organizations have also encouraged greater public skepticism about the credibility and managerial skills of the scientists, technicians and other spokesmen for science and technology

involved in public affairs. Over the last two decades, environmental organizations have repeatedly challenged the competence of scientific experts and the quality of science supporting opponents in political and administrative battles. These unrelenting technical controversies over the management of commercial nuclear power, the regulation of pesticides, the setting of appropriate air and water quality standards and many more have educated the public on the limits of scientific expertise. Many environmental groups have effectively promoted local citizen involvement in decisions about the environmental hazards (Dunlap, 1982).

Concerns about the environment of Karnataka state and understanding of its importance in the developmental efforts of the state has increasingly engaged the attention of the Governments, NGOs, research organizations and informed people in general.

Karnataka State is known to be a progressive state with its pioneering efforts in promoting environmental conservation and awareness. The resource use and conservation dynamics of the state has captured the attention of all sections of the state, leading to several commendable efforts launched in the state to study the document the resource base and environmental concerns involved in developmental activities. The academicians, researchers, social workers, administrators and the people have contributed to the cause. The consolidation of such efforts by providing the much-needed support to such activities with an organized effort to bring out user-friendly information on the environmental status of Karnataka State is no doubt the need of the hour. The state of environment report will not only be a useful tool for policy makers and

administrators but it would also help give direction to developmental efforts in the field of environment. Although there is consensus to conserve our environment, there are very few clear-cut ideas and documentation of experience for use that can help people at large to know how one can go about doing the exercise. It is also observed that general social awareness about environmental conservation is lacking among most of the people who are directly dealing with it (Ramprasad and Channesh, 2000).

The healthy green rural environment in recent years has encountered divergent environmental hazards as an addition to their existing issues of social and economic hardships. Such threats badly affect the local community. In this context, sustainable rural development is felt as a necessary intervention to fight against poverty, unemployment and other complicated problems in rural areas. Sustainable rural development can promote growth at the grass root level by creating awareness on social forestry, bio-diversity, soil conservation, population control, protection and restoration of tanks, rural energy management and popularization of eco-friendly agricultural activities and so on. The sustainability of development for rural masses must dexterously and lucratively aim at motivating the people to get involved in community action concept and to ensure their participation in diverse and numerous environmental protection and optimum utilization of natural resources. Therefore, there is no doubt that sustainable rural development will obviously lead to an over all growth of rural areas & towards rural reconstruction (Anil Agarwal 1985).

Kumarappa (1995) quotes, that the protection of the Environment is mainly in the hands of the people. People's participation is an imperative need.

Environmental protection is possible only through effective participation of the people and any conservation effort without the involvement of the people would be futile. People or community's participation plays an implicit and inevitable role in deriving the fruits of development from development schemes. Environmental issues cannot be solved unless the local communities take part in it like afforestation activities, i.e., arresting of deforestation could be carried out only with the help of the communities.

*SARCC (1992) states that in the "Development process, the poor participate as subjects and not as objects. This process is necessary to generate human development and equity. Further, participatory appraisal assures the asset of the poor, right for their resources and a fair share from the surplus". Unless the people are put at the core of any development activity, the relationship among the environmental development ceases to exist (Rathore 1994). The participatory approach to environmental protection can be strengthened through the decentralized planning which provides opportunities for the all communities to effectively participate in the development process provided the environmental issues are made a part of local plans (Sudhir 2001).

It is high time for all to understand the present environmental crisis and find out suitable solutions to tackle this awful situation. The dictum, "Prevention is better than cure" is more related to the present day's environmental issues as it is directly proportional to man's survival problems. Thus, sustainable development hints at the rational use of resources with the support of people i.e., people's participation and economic policies adopting strategic environmental management practice (Anil Agarwal 1985).

To adequately understand the significance of international environmental policy in the present and in the future, its origin and evolution need to be understood. Political unification of the world is necessary to match its ultimate biospheric unity and to contain the parochial tendencies of mankind that lead to international conflict. Many environmental issues threatening the biosphere today cannot safely be set-aside until the political, social and economic antagonisms among nations are resolved. But people who collectively dislike one another can work together when faced with a common threat. This is the politics of antagonistic cooperation—perhaps the only strategy realistically available to defend the earth against human egoism, aggression and lack of fore sight (Lynton Keith Caldwell 1972).

(Seth (1999) reported on Globalization and the grassroots movements, the idea of economic development of nations acquired a generic connotation in the post-world war era and began to be purveyed as a universal paradigm, not merely of economic growth but of the multi-dimensional development of countries the world over) In the ensuing international politics it was projected as a neutral, non-ideological model, which a country could ignore at its own peril.

(Medha Patkar (2000) writes, the mass social-environmental movements in India are speaking a new language of development that focuses on democratic decision-making and environmentally benign technologies.) In India the last three decades have seen the emergence of various movements to save natural resources. These movements led by the empowered sections of the adivasis, peasants, fisher folk, grazers belonging to the dalit and backward sections and with an encouraging contribution from women are defining the

idiom and medium of their struggle. The agenda of these social environmental movements is rooted in the natural based communities who assert their right to life and livelihood.

2.2 Information Management:

Information is data recorded, classified, organized, related or interpreted within context to convey meaning (Blumenthal, 1969). Information is pertinent data, or data that is useful in decision-making. Because its importance to the user is relative and depends on changing situations, times and needs 'information' is most valuable when it is quickly and easily available (Ray Prytherch, 1990).

Terms like 'information', 'knowledge', 'data', 'language', 'meaning', are in common use in everyday discourse. Data are facts, concepts or instructions in a formalized manner suitable for communication, interpretation or processing by human means. Data are not a static component of an information system. They are evaluated, refined, documented and augmented in many ways between collection by an instrument or an observer and their publication and archiving.

Thus the data mature, both in a scientific sense and an information management sense, as they are processed by scientific investigators and the information system staff (Cawkell, A.E., 1991). Information is obtained through processing of data that is the result of modeling, formatting, organizing or converting data in a way that increases the level of knowledge for its recipient. Data is the smallest element of information. Bell Daniel (1974),

quotes the basic purpose of a database is to enable to access stored data so that it can provide information that users require.

Information is not a static component. They are evaluated, refined, documented and augmented in many ways between collection by an instrument or observer and their publication and archiving. Thus they mature, both in a scientific sense and an information management sense. Often, only when users see the information in the context of an integrated system do they become aware of and express their true needs for consistent formatting, quality assurance, relational link with other information and documentation (McMullen R.M 1973). Information management is a communication process and implies the circulation of message between a source (emitter) and a target (receiver) by means of a carrier (channel) (Shannon and Weaver 1949).

Generally there are three stages in the maturation of a set of information. Like a maturing individual, there is a first period of infancy, followed by a transition phase that could be called adolescence and finally adulthood. In the first stage the information is acquired or collected as data and it is subjected to basic scientific manipulations that make it usable. It is processed into a basic scientific information system to provide for further manipulation or for release to a larger group of investigators. At the second stage it is further refined after review & revision. Additional integration with related data sets from other sources may also occur. At the third stage, revised, quality assured and documented information are released in standard format to the general community. Thus it is very clear that the services to be provided by information management vary significantly from stage to stage (Strebel et al 1992).

Today, Science dominates the lives of all mankind, and its vital element—‘information’ is of great importance to the world. All our economic and social progress depends on the transfer of scientific and technical information. People in different situations require information on a subject in different forms and with different emphasis, and different depths of explanation. Even the same person seeks information in different ways and forms on various occasions, depending on his knowledge of the subject and the reasons for wanting the information (Liebenau 1990).

This interdisciplinary field draws on and combines skills and resources from librarianship and information science, information technology, records management, archives and general management. Its focus is information as a resource, independent of the physical form in which it occurs. Books and periodicals, data stored on local or remote computers, microforms, audio-visual media and the information in people's heads are all within its scope (<http://www.willpowerinfo.co.uk/infoman.htm>).

Koontz (1984) states, managing, may be considered as an input-output transformation process. An organized enterprise receives input from the external environment, converts them into output and gives it to the environment. The transformation of input to output is brought about by the managerial functions of planning, organizing, staffing, leading and controlling. This process is continuous and in practice these functions take place not necessarily in the sequence stated above. Scientific tasks such as data entry, archiving, security and quality assurance many of which are simply viewed as scientific custodial services has driven scientific organizations into data management.

Beginning with design of data format, collection and documentation, analysis and interpretation, concluding with synthesis, review and publication we see data management expanding and evolving to emphasize the timely and effective transformation of data into information and provision of the information to scientists, managers, policy makers and the public (Stafford et al., 1986; Gorentz, 1992). Thus this evolution is anticipated to lead to emergence of 'scientific information management' as a discipline with both management and research as fundamental components of this activity (Stafford et.al.1994).

Traditionally, scientific communication has relied on information exchange through written documents. These documents present scientific concepts, theories and conclusions and may include summaries of the empirical data that support the conclusions. During the past 10-15 years, information exchange has begun to include the compendium of data, where the data themselves are viewed as a product (EPA, 1993).

There was an interesting discussion of the definition of "information management" on an Australian mailing list last year. "Information Management describes the means by which an organization efficiently plans, collects, organizes, uses, controls, disseminates and disposes off its information, and through which it ensures that the value of that information is identified and exploited to the fullest extent". This comes from the [Queensland] Ition Planning Branch (IPB) Information Standards. Information Standard No. 24 is titled 'Policies for the management of information within government'.

Computer based information systems are becoming increasingly pervasive in our lives in recent years. Looking back we find that just 50 yrs ago there was hardly any talk about electronic databases or information systems. It was only due to revolutionary advances in information technology and the resulting information explosion in subsequent years that the need to manage the massive volume of data became critical (Saunders 1985). According to a few estimates the volume of information is increasing. Electronic databases and Database Management System came into being precisely to handle this overflow of data or information flood. The promise of a DBMS lies in its ability to provide timely and consistent data, to enable users to access those data directly without technical assistance and to evolve easily to meet changing user requirements (Curtice, 1986).

As a result of the expanding scope of environmental research, developers of environmental databases must now address difficult and diverse issues: the wide variety of data being considered for inclusion; the size and complexity of databases being created; their design, development and utilization; increasingly sophisticated analytical requirements; new systems to provide information about and access to databases; and the integration of data from various sources and disciplines. Concomitantly, attention to management of environmental data within scientific organizations has increased. The intensified focus on effective management of environmental data is based on the premise that data like people, machines and capital are a significant organizational resource and product (Michner 1986).

Environmental research at the project level requires integrated computational services that provide access to sophisticated database, statistical and numeric operations and to technical text support and these operations could be supported collectively by a scientific DBMS (Conley et al., 1986).

The task of information management lies in improving the performance of information workers through the use of Information Technology. Therefore, information management should provide support to information workers in their task execution; ensure better coordination and communication through the system network; and direct link-up of information workers with the decision making processes of individuals or groups of individuals (Spargue et al. 1986).

Managing information has gone far beyond a mere 'custodial service'. New directions in environmental data management have emphasized the shift in focus away from sheer data volume and towards information. A properly instituted and supported Data Base Management System (DBMS) can enhance the quality of environmental science, and environmental research. A properly instituted and supported DBMS can increase the productivity of environmental researchers and enhance the quality of environmental science reducing the time scientists devote to learning details (Frawley, *et. al.*, 1992).

Scheuermann et al., (1990) quotes, new techniques are needed that support the interoperability of autonomous databases. In the future, scientific organizations will likely use multiple file and computer servers with ease from their desktop computers. Hierarchical storage servers will provide transparent access to huge amounts of storage. Organizations may have heterogeneous

DBMS differing in their capabilities and structure and dispersed over several sites. The distribution in the public and private domains makes it imperative to share access to these databases.

Coupled with new research directions in the environmental sciences and with improved technologies, information management will evolve far beyond its traditional scope. Information Management within scientific organizations historically has been driven by the need to support specific tasks. The importance of fully integrating information management into the research process beginning with the design of data format, collection and documentation following through in data collection, quality assurance, analysis and interpretation; and concluding with synthesis, review and publication has been emphasized (Stafford *et al.*, 1986; Gorentz, 1992). We see information management within scientific organizations necessarily expanding and evolving to emphasize the timely and effective transformation of data into information and provision of the information to scientists, managers, policy makers and the public. We anticipate that this evolution will lead to the emergence of 'scientific information management' as a discipline. The focus on 'information' will ensure that both management and research are fundamental components of this activity (Strome *et al.*, 1977).

A properly instituted and supported DBMS can increase the productivity of environmental researchers and enhance the quality of environmental science reducing the time of scientist (Risser and Treworgy., 1986). Technologically advanced societies frequently cannot transform new ideas into successful products quickly (Strome and Lauer., 1977). Acceptance in any field is complex, and decades often elapse before practical applications of research are

achieved. We anticipate the emergence of 'scientific information management' as a discipline with both a management and a research component, emphasizing the timely and effective transformation of data into information and knowledge for scientists, managers, policy makers and the public (Beldose and Barber, 1993).

Co-directed Research: Co-directed research may be defined as the integration of basic and applied research to better address issues with management, policy and societal implications. Foci of co-directed research include natural resource management and sustainable development, environmental monitoring, environmental risk analysis and restoration ecology.

Natural resource management has received much attention recently. Better management of our natural resources requires that we develop an environmental monitoring programme that allows us to identify and track the condition of specific resources at appropriate spatial and temporal scales. The United Nations Environmental Protection Agency (Environmental Protection Agency, 1991) is launching a program to assess status and trends of the earth's natural resources. The United States Geological Survey has begun a more modest programme—the National Water Quality and Assessment Program (NAWQA) to monitor the nation's water resources (Hirsch et al., 1988). Similarly, many new strategies for management of forest resources may be viewed as broad-scale experiments, the outcome of which can be followed by long term monitoring.

The success of new resource management strategies and their efforts on ecosystems and industrial development cannot be assessed without precise

methods of analyzing environmental risk. The relatively new field of environmental risk analysis seeks to develop a robust capability for predicting ecosystem risk that can be used for management, policy development and validation of ecosystem models (Whyte and Burton, 1980). Research in restoration ecology (Jordan et al., 1987; National Research Council, 1992) focuses on applying fundamental ecological principles to the restoration of natural ecological patterns and processes in degraded habitats.

Implications of New Research Directions: These new research directions have created a need for rapid and easier data analysis; timely, broad-scale, high-resolution data; new analytical approaches; better spatial sampling resolution; and a shift in focus from data to information of knowledge. Recent events like the Forest Summit in Portland, required panels of experts to integrate and synthesize vast amounts of data into meaningful information in order to produce scientifically credible options for policies guiding management of forest and aquatic resources.

According to one estimate, the amount of data in the world doubles every 20 months (Frawley et al., 1992). Moreover, scientists are loath to discard any data for fear that a scientist in the future may need exactly that data set to test a specific hypothesis (French et al., 1990; Silberschatz et al., 1991). As a result, the gap between data generation and data understating is growing and our ability to gather and store data is much more advanced than our ability to manage, analyse and interpret them (Frawley et al., 1992). New experimental designs, broad-scale, spatially explicit sampling programs, geostatistical tools, and other methods that will allow us to better identify patterns and link them with processes must be developed. The extensive databases generated by EOS

and other programs highlight the need for better tools that will support time-series analyses of spatial data.

2.3 Environmental Information

A deep and harmonious relationship exists between man and environment. Physical Environment consists of land, water and air; biosphere provides the food and other requirements of man. Environment creates favorable conditions for the existence and development of different creatures. The protection of the environment today is the concern of the people all around the globe. Industrialized countries and the developing world are faced with a multitude of ecological challenges. The nature and extent of these ecological challenges to man's existence vary from country to country. In India, deforestation, land degradation, siltation of rivers and pollution of water and air are the central features of environmental crises. Man, however, is not helpless in the face of these challenges.

Historically, environmental research has been conducted as small-scale studies involving one or few investigators in a single discipline and funded for relatively short periods. Recently, increased understanding of environmental patterns and processes, coupled with the interest in the landscape regional and global patterns and processes has led to the development and funding of studies on a broad scale and in long-term questions. As a result of the expanding scope of environmental research, developers of environmental databases must now address difficult and diverse issues: the wide variety of data, both spatial and non-spatial, being considered for inclusion; the size and complexity of databases being created; their design, development and

utilization; the different spatial and temporal scales of data collection; increasingly sophisticated analytical requirements; new systems to provide information about and access to databases; and the integration of data from various sources and disciplines. Concomitantly, attention to management of environmental data within scientific organizations has increased. The intensified focus on effective management of environmental data is based on the premise that data, like people, machines and capital are a significant organizational resource and product (Michner, 1986).

Environmental education is the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand surroundings. Environmental education also entails practice in decision making and self-formulating a code of behavior about issues pertaining to environmental quality (Desh Bandhu., 1977). Environmental education is a sustained process in which the individuals gain awareness of their environment and acquire the knowledge and skills to enable them to act individually as well as collectively to solve future environmental problems (Eklavya 1977).

Education is essential for generating widespread awareness on environmental problems. Mass media plays a significant role in creation of awareness for plan of action. Without proper education, an effort made by media and other organizations in awareness analysis action chain does not move smoothly and effectively (Ramanathan, 1982). Environmental education should deal with the underlying relationship between environment and development for a healthy society. Our development must be designed in such a way that it does not damage the environment but builds and restores its

health. Apart from government, people's organizations including NGO's Cooperatives, Self Help Groups (SHGs), Mass Media and Local Institutions should be involved to promote environmental ameliorations by using environmental impact assessment (EIA) and participatory rural appraisal (PRA) techniques (Wood., 1995).

It is a fact that in this decade there is an increasing amount of exposure to the environmental issues but they are unable to reach up to the grass-root level. People's participation in environmental plan of action has great potential. Thus, access to media and other modes of communication is primordial for creating awareness about the environment. Protection of environment is an essential part of development. Without adequate environmental protection, development is undermined; without development, resources will be inadequate for required investment and environmental protection will deplete. Damage to environment, affects present and future human welfare. It harms human health, reduces economic productivity and leads to the loss of amenities. Some problems are associated with the lack of economic development, inadequate sanitation and clean water, indoor air pollution from biomass burning. Many types of land degradation in developing countries have poverty as their root cause (Swaminathan, 1996).

The fight against environmental degradation is not the only concern of the government; it has to be an issue of every body's concern. 'Silent Valley project' in Kerala and the 'Chipko movement' in the Himalayas in India is a welcome sign of people's awareness. The role of rural women folk in the Chipko movement is heartening (Kumar A Biju, 1999).

Transformation of consciousness is demanded of modern man if environmental issues are to be confronted and resolved. The notion of economic growth are to be transformed into the notion of ecologically sound growth; development *per se* into eco development. Such an economics would measure productivity not merely in terms of localized outputs and systems, but in relation to its impact in society and the environment as a whole. A participatory attitude calls for respect and care for the environment while not precluding efforts to transform it, which certainly goes beyond the indifference that has traditionally characterized man's attitude towards the environment (Gregory, 1970).

The environmental crisis is an outward manifestation of a crisis of mind and spirit. There could be no greater misconception of its meaning than to believe it to be concerned only with endangered wildlife, human-made ugliness, and pollution. These are part of it, but more importantly, the crisis is concerned with the kind of creatures we are and what we must become in order to survive. Humanity lives in two realities. The abiding reality is that of the earth—the planet—independent of man and his works; the other reality—is that of the world, which is a creation of the human mind. The world is the way humanity understands and has organized its occupancy of the earth—an expression of imagination and purpose materialized through exploration, invention, labor and violence. All living men may be of one species, but their values are diverse. Physically, men belong to the earth, yet intellectually they may transcend it—a dangerous liberty when dissociated from regard for the necessities of life on earth (Lynton, 1984).

Unlike the environmental disasters encountered by prehistoric and primitive man, the modern crisis is largely man-made—a consequence of the failure of human insight and ingenuity to predict and prevent the ill effects of human imagination and purpose. The constructive achievements of civilization demonstrate mankind's ability to learn from experience. Learning experience occurs when there is congruence between what man believes in his mind and what actually happens on earth. When "seeing is believing," people may recognize the danger to their own futures in soil erosion, deforestation, species extinctions, and environmental pollution. When they do not see, they may not believe—yet they may believe things that the experience of life on earth confirms. Mankind's environmental relationships thus comprise a profound problem in human psychology. The problem, in essence, is the reconciliation of man's view of life on earth, expressed through culture, with nature's ultimate ground rules for continuing existence. It has been a problem addressed by anthropologists, behavioral scientists, philosophers and theologians. The growth of the environmental movement to international and global proportions has been a historical development, which is difficult to evaluate. The development has been without clear precedent—but with antecedents.

Understood in its full context; it may seem as an awakening of modern man to a new awareness of the human predicament on earth. This need, to foresee the probable consequences of human activities has generated new techniques for monitoring the environmental change and for assessing the impact of present and proposed actions upon the natural, social and cultural environment (Lynton, 1984).

During the 1960s a crescendo of public concern, first expressed in the popular press, culminated by the end of the decade in national environmental laws and policies. In the early sixties, however, a number of books appeared that had an immediate and obvious influence on public opinion. Best known of these was (Rachel Carson's *Silent Spring*, 1962) which aroused public apprehension over the new chemical pesticide technology and prompted investigation at the highest political levels in several countries. In some respects environmental conditions were better than they had been a generation earlier, but the new dangers exemplified by DDT, atomic radiation, photochemical smog, and massive destruction of natural environments posed more serious threats to the environment. An earlier generation had worried about the health effects of coal smoke in the air. Informed people in the 1960s became concerned about burning coal for energy and the resulting acidic fallout from stack gases and changes in the carbon dioxide balance in the earth's atmosphere. In rapid succession, during the 1960s, enlightened public environmental awareness expanded from local to national and from national to international and worldwide horizons.

The capacity of living things to affect the geophysical environment is not the prerogative of man. The most significant environmental changes were caused by the earliest forms of life. When man acquired knowledge of the use of fire he himself became an important agent of geomorphologic change. From Paleolithic times fire became a potent technological instrument in human hands. The versatility of this tool must have been amazing. It could be used to clear forests for agriculture or to improve grazing land for domestic animals. Hunter man could employ it to attract game, to keep away and kill predatory animals, ticks, mosquitoes and other pests. Fire was also used for cooking,

breaking up stones for tools, to make pottery, smelt ores, harden spears and provide warmth. There is evidence that some savannas, temperate grasslands and shrub-lands have been formed by the action of fire (Goudie, Andrew, 1981).

Contrary to predictions that environmentalism would be trendy and transient public enthusiasm, support for the movement and its political agenda has been broad and vigorous since the inception of the first environmental era in 1970. Environmental organizations have become extremely adept at arousing public concern on environmental matters and turning it to political advantage. "Protecting the environment is so important that requirements and standards cannot be too high, and continuing environmental improvements must be made regardless of cost" (Riley E. Dunlap, 1989).

Reflecting on the conservation measures adopted during the past years, through political will and commitment most of the threatened wildlife and their habitats could be saved. The past has been a fruitful year for the conservation scenario in Karnataka. Several important events and initiatives were taken up during this period that would set a new trend in the protected areas of our state. The apex court of our country passed a landmark judgment ordering the closure of the ecologically devastating mining operations carried on in Kudremukh National Park. The decision to stop mining would protect the livelihood of millions of marginal farmers dependent on the Bhadra, Tunga and Nethravathi rivers that originate in the forests of Kudremukh. Though wildlife conservation is largely perceived as the protection of large charismatic mammals for the indulgence of urban elite, the overall benefits for the entire society accrue through saving an entire ecosystem that includes even micro-

organisms, is immense. We might not understand the prominence of our wildlife both large and small, until the consequences emerge, which by then would be irreparable. These complex ecological webs, which contain yet unexplored wild genes of food plants, fibers, chemicals and designs are invaluable biodiversity assets that is critical for survival of human kind. (Deccan Herald report Dec 28th 2003)

The revelations by the Centre for Science and Environment (CSE), a non-governmental organization, on the presence of pesticide residues in bottled water and cold drinks, rattled not only the industry but also millions of consumers across the country. At stake was not just the Rs.1 crore bottled-water industry but also the estimated Rs.6 Crore cold drink business, dominated by the two multinational companies. We believe that this critical issue of public health has now come to the forefront. There are two major concerns involved. One is growing pesticide contamination in the country and the second a need to impose stringent regulation says Sunita Narain., Director, CSE. Pesticides in drinking water and soft drinks pose long-term health hazards, and there is an urgent need for stringent regulations and policy in the area

When the Pollution Monitoring Laboratory (PML) of the New Delhi-based CSE analysed 17 different brands of bottled water commonly sold in the National Capital Region of Delhi, 34 bottles picked up at random were tested for organochlorine and organophosphorous pesticides, covering the spectrum of pesticides most used in India using the methodology approved by the United States Environment Protection Agency (USEPA). We believe that this critical issue of public health has now come to the forefront (Aarti Dhar, 2004).

2.4 Environmental Awareness

Millions of species of plants, animals and other organisms enrich our environment. Awareness of the importance of this biological diversity has grown in recent years along with concern that more effective action is needed to preserve it. Ecological degradation of wetlands together with pollution has resulted in the loss of flora and fauna. Organic pollution of water is the most serious problem in most of the developing countries. There has been a marked increase in the surface water pollution caused by the use of fertilizers, pesticides and acid rain (Kumar, 1999)

Since the 1960s, there has been a growing interest in the environment, or more specifically in the damage being done to the environment. This may have fluctuated in its intensity, but those fluctuations have been around an upward trend. The environmental revolution has been gathering momentum and has developed rapidly in the 1990s (Richard welford., 1996).

Education is development, and a powerful means of transfer and percolation of knowledge. Environmental education is to aim at educating man to realize human-environment interaction for proper and realistic symbiosis. The past few years have witnessed a significant upsurge of awareness of the problems of scarcity of resources, ecological disturbances and environmental pollution due to explosive population growth, rapid industrialization and

uncontrolled use of natural resources. These global problems facing the mankind found significant expression in the United Nations Conference on Environment in Stockholm in 1972 (Agarwal et al., 1984).

Environmental education ought to be high on the environmental movement's political agenda. That is much more than promoting public exposure to environmental information through the mass media, or citizen's involvement in the environmental activities. Environmental education ought to involve the requirement that ecology be a component in the public education environmental information management of every citizen: environmental literacy should be inculcated in the nation's education as an essential attribute of scientific literacy within the schools because it is the most direct way of bringing the environmental message to the young people (Brownstein., 1989).

Environmental Education has been receiving a renewed thrust in recent years in India. Education and creation of public awareness on environmental issues are therefore important tasks for generating a new outlook and ethics among the public towards the environment. Environment education has to be achieved both at the formal and non-formal levels (Nair., 1986).

Environmental education to understand the intimate relationship between the quality of environment and human well being has an important role to play in the direction of preserving the environment. Rapid growth of world's population is affecting the earth's surface at ever increasing rate. The early agronomists burned large areas of land to create farm land or pasture, they modified the soil by ploughing, altered the drainage by irrigation,

introduced or bred new animals and crops and altered the new natural vegetation structure of many regions. Renewable resources are being consumed at rates that far exceed the speed at which they can be regenerated or replenished. A hectare of land can be destroyed within an hour but it may take several decades for the forest to regenerate itself (Mazhar Ali Sabri., 2004).

According to an estimate, the destruction of tropical rainforest is occurring at a rate of 40 million acres per year, mainly as a result of human activities. As the population increases, the requirements for fuel wood may exceed the sustainable natural supply, leading to the shrinkage of woodlands. At the same time, the urban or rural requirement for wood in construction purposes puts an additional demand on the forest cover. The combustion of fossil fuel (coal, oil and gas) emits carbon dioxide into the atmosphere. Carbon dioxide constitutes the largest source of greenhouse gases, which trap infrared radiation that would otherwise escape into the atmosphere. The industrial revolution increased carbon dioxide by about 25 percent. Since 1950 emissions from fossil fuel use alone have increased 3-6 times. Water pollution is the most serious environmental problem facing developing countries because of its direct effect on human welfare and economic growth. The diversion of fresh water to supply agricultural, industrial, domestic and municipal needs stretches hydrological cycle. Fertilizers and consumer goods also have a powerful impact on water quality.

The network of media and information technology is vital to disseminate environmental education in motivating people. Technology acts as a practical tool and media acts as a communication tool. Information system on environment must be considered as one of the management tools for planners

and policy makers. The availability of adequate information is a must to improve project implementation and to utilize the available resources in a sustainable manner. Mass media like radio, television, newspapers and journals must be used to educate the people to understand the forces of nature as a whole and their participation in the process to understand and utilize rather than to destroy due to lack of understanding of the environment. It is a fact that in this decade there is an increasing number of books and magazines and T.V. Channels dealing with environmental issues but they are unable to reach up to grass root level. In many cases, the public responds as a result of increased awareness of the dimensions of the problems due to the catalytic role of the mass media (Kumar, A. Bijju, 1999).

Sen (1991) quotes, the lack of environmental education in particular and education in general is also responsible for the adequate growth of people's awareness. It is now being accepted that the environment is not a free resource and a new ecologic and environmental concern is growing where living and natural resources are not undervalued and every economic project is assessed in terms of the environmental degradation associated with it.

The problems of industrial pollution in different forms and the consequent environmental problems have been known to the people and government since the initial period of industrialization. But the legislation enacted in this field at different times have, often turned out to be ineffective in curbing the environmental problems. Baxi (1991) reports, the constitution of India as originally adopted has been environment blind. Only since the 42nd Amendment of the constitution in 1975, has Article 48A been introduced, requiring the state to endeavor to protect and improve the environment and

safeguard the forests and the wildlife. Also the amendment invoked in Article 51A, added the following as a citizens fundamental duties: 'to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures.

Sarma (1991) reports, the government of India has adopted a number of steps for environmental safety. Since 1972, a number of legislations that have been enacted –

The wildlife (protection) Act, 1972

The Forest (conservation) Act, 1980

The Water (prevention and control of pollution) Act, 1981

The Environment (protection) Act, 1986

Also there is now a Central Pollution Board and corresponding boards at the State Level. An industry wise standard for discharge of pollutants has been fixed with incentives to industrial units for installing pollution control equipment.

Sharma (1991) states, the list of industrial pollutants is neither exhaustive nor static. With ever expanding areas coming under the process of industrialization, instances and intensity of pollution are on the increase. As the awareness of people about the necessity and benefits from environmental awareness is very low, these cases of pollution cannot be checked unless they are opposed by active group of people who can bring the public authorities concerned to perform their duties of protecting the environment.

Sen., (1991) quotes, while the environmental problems in India is not only worsening but also reaching new dimensions there is also a growing awareness of its adverse effects and people are actively trying to resist environmental degradation for the sake of their own future.

Sundaresan., (1991) reported that the main culprits for creating the problem of hazardous industrial wastes have been industries producing chemicals and allied products. The toxicity of some of them is so high that they gradually pollute the whole environment. Turning to specific areas suffering from industrial pollution, we note that, this dilemma of development; is being faced by the industrially advanced provinces of India

Mining activities are also creating a significant degradation of the environment. Mining is one such human intervention, which has brought a major change. Land that has suffered from mining activities may be described as spoiled or disturbed. Land that is damaged is incapable of beneficial use without proper treatment. A thorough knowledge of the degree of disturbance of land is essential to assess the damage and limitation to reclamation (Channesh., 1989).

The change in human activities led to major changes on land surface. During the last few decades several million hectares of land lost its potential to produce biomass, with a varying degree of ecology. Mining is one such human intervention, which has brought a major change. Land that has suffered from the mining activities may be described as spoiled or disturbed. Land that is damaged is incapable of beneficial use without a proper treatment. A thorough

knowledge of the degree of disturbance of land is essential to assess the damage and limitation to reclamation (Channesh and Srinivasamurthy 1989).

White and Tolba, (1979) quotes recognition of the possibility of humans changing the environment on a global scale, either deliberately or inadvertently, has led to a major redirection of scientific effort toward the study of biogeochemical cycles.

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Channesh (1995) quotes on small farming ecosystems reserves. The ecological dynamics of such a farming practice lead to a healthy soil environment. These practices not only reduce the inputs, but also minimize risks by maintaining traditional and ecologically sound technologies, which have been neglected in the modern technological world of economic thinking.

In India more effective results of the prevention of environmental destruction are produced by large number of non-governmental organizations. Among them, mention must be made of the Chipko movement, a peasant initiative, to stem deforestation, which swept Uttarkhand in U.P; Silent Valley Project; The Narmada Bachao Andolan against the Narmada Dam. All those organizations achieved considerable success in slowing down the pace of very powerful processes of destructive development in their respective areas (Sen ., 1991).

In the Citizens' Report on Indian Environment (Agarwal et.al., 1982) forests have been singled out as the element of environment, subjected to most destruction and degradation. The effects of forests destruction on soil erosion, floods, siltation of reservoirs, loss of genetic diversity, etc. are well known

(Allen 1980., Whitmore 1975., Ghosh & Rao 1979., Khoshoo 1984). Destruction of forests affects not only future generations but also the present. Communities directly dependent on forests are particularly affected by environmental changes due to forestry (Gupta et.al., 1981., Menon 1984., Gadgil 1984).

Awareness through Social Forestry programmes has been introduced in India in 1970s. The importance of tree plantation was recognized much earlier in the form of 'Vanamahosthava'. The objective was to popularize tree plantation so that people can realize the importance of tree plantation.

Utilization of forest resources at the village level for the satisfaction of domestic needs of fodder, fuel, small timber etc will be essential. Unfortunately, the British rulers had ruthlessly denied the villagers a right to these forest resources. Accordingly, these requirements were not internalized in the working plans of the forests (Bandyopadhyay., 1984). Though the 1952 Forest Policy accepts the satisfaction of these basic needs as primary, no systematic analysis has been undertaken to see the ecological implications of the forest resource utilization at the village level (Bhattacharya., 1983; Singh 1984).

In 1973 the famous Chipko movement -- the movement to hug trees— in Uttar Pradesh is probably the world's most well known grass root eco-development movement. The Chipko movement even winged its way in Balegadde village in Uttara Kannada. People took an oath to protect the trees by embracing them- this came to be known as 'Appiko' in Kannada. When the axe man came for felling to the Kalase forests, people embraced the trees and

thus the 'Appiko Movement' a simple non-violent action was launched. This movement focused the attention of the world to the much-overlooked vital fact that the prime economic role of the Himalayan forests is the regeneration of water resources for the country and the stabilization of soil to ensure this role. They should not be destroyed in the process of extraction of commercial timber.

D'Monte, (1984), reported in the Illustrated Weekly, the people in a rally on April 9, declared that they will form a chain on human hands to save their trees.

Madhav Gadgil, (1998) has stated that, in the coming years, our conservation successes and failures will depend not so much on creating more national parks and posting more guards with better guns as on creating an accountable, broad based, participatory system of governance.

Sensitizing the State Forest Departments to the rural social structure, greater decentralization and sharing management responsibilities with local communities will help protect forest cover (N.C. Saxena 2002)

Rathore (1994) states that unless the people are put at the core of any development activity, the relationship among the environmental development ceases to exist.

Kumarappa (1995) states that the environmental protection is possible only through effective participation of the people, and any conservation effort without the involvement of the people would be futile.

The Participatory approach to environmental protection can be strengthened through the decentralized planning, which provides opportunity for the rural communities to effectively participate in the development process, provided the environmental issues are made a part of local plans (Sudhir 2001).

Shiva and Bandyopadhyaya (1985) states that the large-scale introduction of Eucalyptus hybrid in India is contributing to such land aridisation, first, by its high water uptake and second by its insignificant contribution to humus formation. There is no scientific work done yet on the water relations of indigenous tree species but it is apparent that their root systems, their crown morphology, their physiology are adapted to the hydrological conditions prevailing in the tropics and that indigenous or naturalized plant species contribute to water conservation in a number of ways.

Bandyopadhyay et al., (1983) submitted a systematic analysis of the Doon Valley ecosystem, which largely helped the public as well as the decision-makers to understand the underlying ecological processes. It also convinced the people that there is a public interest cause against irresponsible and reckless quarrying. Movements were launched against limestone quarry. The Government was reluctant to close down the mining operations, which had created ecological havocs. The mining operations had already destroyed forests and natural springs.

Mukundan & Sudhir (2002), observed that the rural people's level of environmental awareness and participation is important with respect to environmental endeavors.

The case of Bhopal gas disaster in 1984, one of the countries biggest industrial accidents where hundreds of people died and many more were disabled, when a hazardous industrial unit located in the heart of the city leaked due to lack of proper security, but the victims are yet to receive adequate compensation due to ongoing legal battles (Meena Menon., 2003).

While sufferings caused to the gas leak victims have been documented, the reproductive health consequences of the disaster have never received any official attention. The death of more than three thousand, and serious damage to 200,000 people in Bhopal, from the leak of the poisonous gas from the pesticide plant of Union Carbide Corporation is an example of both the magnitude and speed of the damage that is potent in the present system (Dinesh., 2004).

Thus the development of an environmental perspective geared towards the enhancement of the quality of the environment reveals the importance of man's creative role in the universe. An environmental programme is not likely to be successful until there is a general population with a sufficient degree of environmental sensitivity and awareness to support it. The mass media and the school system could play an important role in heightening general environmental sensibility. This in turn would promote attitudes that would look at all human activities—agriculture, industry, technical innovations, economics, etc.—from an environmental perspective. Finally the practical

application of environmental knowledge is important. The holistic nature of environmental problems requires everyone to cooperatively act in an environmentally sensitive and responsible manner to provide effective environmental protection. Thus each person must act locally in the global interest in order to achieve environmental goals (UNEP 1982).

Capra (1982) emphasis the orientation 'Think globally, act locally'. Each action has to be made locally, but if done in an environmentally directed and self-transcendent manner, it would be aimed at the global good. The selfish and atomistic orientation of contemporary culture tends to encourage people to both think and act locally. This is precise at the root of many environmental problems.

Thus environmental awareness offers the opportunity to close the gap between rhetoric and reality, between saying we should follow sustainable development paths and actually taking the steps to persuade societies and individual to do so. Protection of environment is an essential part of development, without which development is undermined: without development, resources will be inadequate for required investment and environmental protection will deplete. Damage to the environment affects present and future human welfare. It harms human health, reduces economic productivity and leads to the loss of 'amenities' (Swaminathan, 1996).

Development and environment explores two-way relationship. First, environmental quality - safe plentiful healthy water and air - a part of developmental efforts. Second, environmental damage can undermine future

productivity. Soils depleted and ecosystems destroyed in the name of raising income today can jeopardize the prospects for earning income tomorrow.

2.5 Karnataka Environmental information Status

Environmental information has been a sustained process in which the individuals gain awareness of their environment and acquire the knowledge and skills to enable them to act individually as well as collectively to solve future environmental problems. It was evident that environmental information had four components – awareness, values or quality, concentration and sustainable development. In fact lack of awareness has led man to be harsh to nature. Thus education of the environment is essential for generating widespread awareness on environmental problems. Mass media plays a significant role in creation of awareness for plan of action. Without proper education, an effort made by media and other organizations in awareness analysis action chain does not move smoothly and effectively.

Purpose of State of Environment Reports

The key purpose of SOE reporting was to provide information and a critical analysis of environmental issues for decision makers in the government, (including local-self governments), industry, non-governmental organizations and the community on trends in the condition of Karnataka State Environment from the states perspective by interpreting data from measures of agreed parameters. This reporting was required to take account of the significant

influence of natural variability of climate (such as draught, flood and cyclones) on environmental conditions.

State environment reports would provide critical comments on fundamental biophysical condition and on key environmental issues as they emerge from time to time. It will present information about environmental trends and conditions based on a coordinated network of datasets. SOE reporting in effect will act as a “report card” on the condition of the environment and natural resource stock at stage level.

The State of Environment reporting system had included data on atmosphere, terrestrial, fresh water, marine and Urban Environments. Data as indicators of ambient environmental quality, information on natural resources and the conservation status of the ecosystems could be compiled. The purpose of this exercise is to document changes in states environment rather than detailing examples of poor environmental objective, coherent and scientifically credible information about Karnataka environment (and its natural resources) for stakeholders. It would also provide information to identify patterns of environmental change and therefore provide a basis for decisions on ecologically sustainable use of resources. It should also assist governments to act in a manner consistent with the long-term needs of the population and the environment. The proposed SOE reporting may not just be a set of reports. It would be a network of geographically referenced datasets that would provide the basis for a variety of outputs to meet user needs such as regular SOE reports, public summaries, education and public awareness kits, adhoc detailed analytical report for policy purposes, data sets for use in models and maps and

eventually online access to soundly based scientific data on the state of environment for community and industry.

Traditionally man has been depending on his surroundings for fulfillment of his basic needs. In the process he has also evolved processes to conserve them and use them in a sustainable manner. However anthropic activities of modern man has hampered in an irreversible manner environmental quality sustained over scores of years. Through generations people have gained knowledge related to different aspects of environment, its uses, threats to it and changing state of environment etc. Over the centuries the local communities have developed knowledge, skills and techniques related to their biological resources use of which enrich our knowledge and experience in dealing with environmental concerns. It is very essential that we document these traditions in some form, and it is logical that it forms part of the activities of state of environment reporting. Therefore, involvement of local people would render SOE reporting more meaningful and purposeful.

Realizing the importance of formulating State of Environment Report, efforts in this direction started in early 80s. The first citizen report of India's environment was published in 1982 and the second came during 1984-85 (CSE 1982 and 1984-85).

These two were general in nature and focused on environmental issues concerning land, energy, forest, dams, health and habitats etc. The third report was different because it focused on floods and later on emphasis was on some specific aspects such as pesticide pollution, traditional water harvesting etc. In Karnataka also, the SOE report was published during the same period with the

first one coming out in the year 1984-85 and this effort continued till 1993 with 6th report being the last effort. These reports with the support of Department of Ecology and Environment covered a wide range of environmental issues of crucial importance, such as vegetation, land, health, Western Ghats, energy, industrial pollution, environmental education etc. Rainfall, climatic conditions were also covered (Karnataka—State of Environment report 1983-84, 85-86, 1990, 1991-92 and 1993). Bangalore was the focus as far as the urban environmental issues were concerned. Some of the selected environmental aspects also found a place in these reports. The objective of these reports was to have a very broad view of the overall environmental scenario of the state and in-depth analysis of a few specific issues that were perceived to be of vital importance to the state.

The Karnataka State of Environment Report is a unique document and the product of an enormous participatory effort of many voluntary agencies and individuals interested in environmental issues. The Karnataka State of Environment Report is an attempt to give a broad picture of the different ecological parameters of the environment of Karnataka touching upon industry, pollution control, eco-development, wild animals, climate, rainfall and so on.

These studies would be helpful in environment management and could foster appropriate action. The data on hours of sunshine and velocity of wind indicate potential sites for locating solar and wind energy systems. Studies on rainfall patterns and agro-climatic zones coupled with details on irrigation, land capabilities and drought could improve agriculture and avoid waterlogging and salinity.

There is a chronic energy crunch in Karnataka. However in trying to overcome this problem an overemphasis on meeting demands has eclipsed the need for proper utilization. To conserve a forest where necessary, to modify it where useful, improve it where possible are basic to any management policy. The State is endowed with a rich variety of plant and animal life. The impact of shrinking habitats has been investigated. Estuarine and marine systems have been explored to work out a combination of increased exploitation together with enlightened conservation.

The poorer sections— urban, rural and tribal are generally the first to feel the impact of environmental degradation. City slums, industrial workers, forest dependent people have been looked at with sympathetic concern. Identifying diseases brought on by environmental changes, building up a healthy populace through proper nutrition are likewise aspects of a holistic environmental strategy. These have been further strengthened by efforts to foster environmental awareness and education and by encouraging community action.

35 papers from 33 contributors make up the 'Karnataka State of Environment Reports' for the years 1983-84, 1984-85, 1985-86. They cover 12 important areas related to environmental conditions in the State.

The following summary gives an overall picture of the thrust areas, papers and contributors:

Topic	Paper	Authors
Climate	The Climate of Karnataka	A.Krishnan & A.Mani
	Rainfall in Karnataka: Variability & prediction	Sulochana Gadgil Yadumani
	Agricultural Zones in Karnataka	Sulochana Gadgil, Malathi Hegde & R. Gowri
Land use and water	Land uses and water resources in Karnataka	Ram Prasad & Kirti Malhotra
	Water-logging in irrigated areas of Karnataka	Ram Prasad & Kirti Malhotra
	Drought hydrology in Karnataka	Ram Prasad
	Environmental impact of quarrying and mining in Karnataka	Cecil.J. Saldanha
	Natural Resources-their management	D.K.Subrmanian
Vegetation and Forestry	The changing vegetation of Karnataka	Cecil J. Saldanha
	Pressure on our forests	S.Shyam Sunder & A.N.Yellappa Reddy
	Impact on agro-forestry practices on environment	A.Narendra Prasad
	Social Forestry in Karnataka	N.V.Nadkarni Syed Ajmal Pasha
	Forestry & Environment in Karnataka	S.N.Rai
Fauna	Status of wild mammals in Karnataka	Madhav Gadgil
	The Elephant –Man conflict In Karnataka	R. Sukumar
	Status of Avifauna of Karnataka	R.J.Ranjit Daniels

Topic	Paper	Authors
Littoral and Marine	Coastal Karnataka and its eco-Development Environment, productivity & Management of the coastal seas of Karnataka	Arvind Untawale & Sayeeda Wagar T.S.S. Rao
	Profile of ecologically important Coastal habitats in Karnataka	T. Ananda Rao
Bioresources and eco-Gadgil & Development	The biomass budget of Karnataka	Madhav
		Madhulika Sinhe
	Ecodevelopment of the Western Ghats in Karnataka	Madhav Gadgil
	Uttara Kannada – a case study in Hill Area development	Madhav Gadgil, K.M.Hegde, K.A.Bhoja Shetty
	Bhairumbe- an experiment in ecodevelopment	B.K.Mishra, Madhav Gadgil & K.M.Hegde
Energy	Energy utilization in Karnataka (Rural Sector)	D.K. Subramanian
	Energy utilisation in Karnataka (Large & medium industries)	D.K.Subramanian T.V.Ramachandra
	Energy utilization in Small Scale Industries of Karnataka	D.K.Subramanian T.V.Ramachandra
	A New fuel-efficient bathroom stove	M.S. Hegde

Topic	Paper	Authors
Urban	The urban situation in Karnataka	Vinod Vyasulu
	Slums in Karnataka	H.Ramachandra
	Bangalore City & its growth	Vinod Vyasulu
	Slums in Bangalore- the human dimension	Colette Monteiro
	The Slums of Bangalore- An example of a GIS as a decision Support system	M.J.de Wit
Tribals Nutrition & Health	Tribals & the changing environment	H.Sudarshan
	Public Health & Environment	H.R.Bhat
	Food & Nutrition in Karnataka	S.G.Srikantia
	Rural and urban nutrition in India and in Karnataka	K.T.Acharya
Environmental education	Karnataka as I saw it and as I see it Now	K.S.Karanth
	Community action & Environment	
	S.R.Hiremath	
	Environmental Education	H.R.Krishna
Murthy Industrial Pollution	Industry & Pollution	S.Hanumanth Rao
	On utilizing industrial effluents in Agriculture- a case study	H.N. Chanakya

Approaches to State of Environment Reporting

The following are the four generally accepted approaches to State of Environment Reporting effort:

1. Model based quantitative approach
2. Comprehensive indicators approach
3. Core indicator approach
4. Opinions surveys

1. Model Based quantitative approach:

Ideally a community wishing to manage environmental quality to maintain the desired quality of life would construct a model of relationship between social and economic activities that can cause environmental impacts. The resulting values of environmental variables and a (multidimensional) measure of the desired quality of life out come. Such a model would be used to identify where the benefits from maintaining or improving environmental quality match the cost of modifying environmental variables. Extensive computer modeling could be required with at least as many variables as used in conventional national economic modeling. In practice, this may not be possible, as there is no strict relationship between individual environmental variables and quality of life. At best, such a relationship would be both ill defined and dependent on other factors such as, Socio-economic variables. Process based biophysical models do however have a role to play in deciding the subset of environmental variables to recognize in SOE reporting.

2. Comprehensive indicators approach:

In the absence of the necessary database and such complete modeling, an alternative is to identify those primary environmental variables or indicators that are known to be strongly correlated with the strong determinants of quality of life. An indicator is regularly measured (monitored), value relevant to its particular purpose. For Comprehensive indicators approach, a detailed monitoring programme would be necessary which would be likely to need a large input of financial and human resources by participating agencies. A Comprehensive SOE report would use the existing Status of a set of environmental indicators to judge whether environmental conditions are at acceptable levels. In addition, it would identify trends in indicator value to predict future values and establish thresholds of action values or more general standards for determinant of quality of life (or other end points). Environmental indicators are analogous to economic indicators in that viewing a set of economic indicators supports judgments about environmental health.

3. Core indicators approach:

The core indicator approach to SOE reporting would concentrate on developing and presenting a core or reduced set of indicators chosen according to some specific criteria. Unlike the Model based and comprehensive indicator approaches, that would have extensive and detailed information requirements, the core indicator approach may be a more feasible approach. The pragmatic criterion for choosing core indicators is that they should reflect priority environment issues or critical environmental conditions. Deciding these issues

should necessarily take into account requirements of policy makers at national, state and local levels in addition to views of general public and available scientific knowledge. SOE reporting cannot expect to cover every environmental issue. Deciding which priority environmental issue to cover is a pre-requisite to determine core indicators set. The chosen set of core indicators must define the status of priority issues as unambiguously as possible. However, concentrating on a set of current priority issues, incurs the risk that an emerging issue may not be identified. For this reason, basic environmental conditions must be continuously researched. The selected core sets of indicators are to be subjected to periodical review, which should take into account results of environmental research and development in deciding indicators.

4. Opinion surveys:

The qualitative approach, to guiding environmental management through the SOE reporting, is characterized by reporting individual and/or group perception of matters of concern. Inputs can range from anecdotal evidence to the result of well-designed surveys. As a way of generating a convincing picture of perception of environment matters, opinion surveys have considerable potential.

Nature and Focus of SOE reporting system:

SOE reports have been based on (1) Environmental statistics (e.g.: Climate, energy used, population changes and pesticide use etc.) which do not necessarily have a casual link with specific observed environmental responses and particularly on (2) Environmental indicators which are more direct

measures of status and trends in the conditions of the state's environment (e.g: Soil acidity, SO₂ in atmosphere etc.) and which link eco system responses to human use of environment. The use of environment indicators to detail changes in the condition of the environment would serve a range of public policy objectives and in particular would provide focus for state SOE reports. Practicality dictates however, that SOE reports would only be able to present and discuss limited or core set of carefully chosen indicators.

A core set of indicators will have to be identified based on policy priorities, resource constraints, state and local government involvement. A first step towards selecting the corset of environment indicators for a state SOE reporting system is to consult widely on the priority environment issues and conditions to be addressed.

Towards evolving an “Environmental Index” of the state:

The SOE reporting programmes have aimed at evolving ultimately to a continuous study and monitoring of the dynamics of the environmental change in the state. The core indicators that are identified, studied and monitored continuously should lead to environmental index of the state, which should ultimately indicate the environmental status as compared to the country as a whole and the other states.

The present reviews of the previous effort showed the above-discussed approaches and have indicated the best efforts in SOE reporting effort with active involvement and support from Department of Environment, Ecology & Forests on a continuous basis.

Some of the areas for SOE reporting with the approaches were included the following,

1. Environment & Agriculture
2. Environment & Industries
3. Environment & Habitat
4. Wild Life Environment
5. Coastal Environment
6. Urban Ecology

The target group of the SOE reporting effort will have as its target a variety of interested groups. It will have a wide coverage across the state including general public, students, researchers, teachers, policy makers and administrators.

In general, the environmental reporting was of public awareness interest and serves the source of environmental information. It has been strongly believed that the amount of literature produced is quit high and has been the result of interest of the most awakened scientists and activists. Generation of material pertains to earth and its long lasting health has been the concerned.

The reviews revel that the analysis of the information provided by the different sources has met the local as well the global interest. But the administrative applications of the analytical results were very few. This conflict of agreement found both in local issues as well with global issues.

The tools and information provided and generated by the environmentalists have sufficiently guided environmental researchers. The advantage of these enormous sources is its strength, and the improper utility with proper analysis for a given place and time may be its constraints.

METHODOLOGY

III. METHODOLOGY

The investigation taken up for study mainly aimed to understand the environmental concerns developed, with the aid of management of environmental information. It was also aimed to realize its impact in sensitive zones. This was taken as a prime material to develop a suitable model of environmental information management system (EIMS) by studying the strengths and weakness of the available and possible environmental information systems.

The details of the study components and methodologies followed for the investigation on the environmental concerns through environmental information management and its impact on building public awareness in sensitive zones of Karnataka, are explained under the following subheadings.

3.1 General description of the study area

3.1.1 Location

3.1.2 Climate

3.1.3 Topography

3.1.4 Ecological context vis-à-vis vegetation

3.1.5 Drainage features

3.2 Sampling Procedure & Methods of data collection

3.2.1 Selection of Personnel

3.2.2 Selection of Events and Activities

- 3.3 Case Study
- 3.4 Operational definitions
- 3.5 Practical utility of the study
- 3.6 Pre test
- 3.7 Constraints to the study
- 3.8 Analysis

3.1 General description of the study area

In the study of realizing the ecological concerns through environmental information management of a particular place certain issues like location, climate, topography, geology, vegetation and drainage streams are considered. The sites were selected for the study based on the ecological sensitiveness and importance in the environmental aspects of the state.

The features of the study area are such that their eco sensitivity was of prime importance in the state. Location wise also, the places has been the most eco-sensitive, because the most important catchment of the state, drained water runs through here. This has been a place of most important rivers and water source of entire Tungabhadra sub-basin.

The geographic location of the areas has been shown in Fig.1. A brief description about the places selected for the study has been given further.

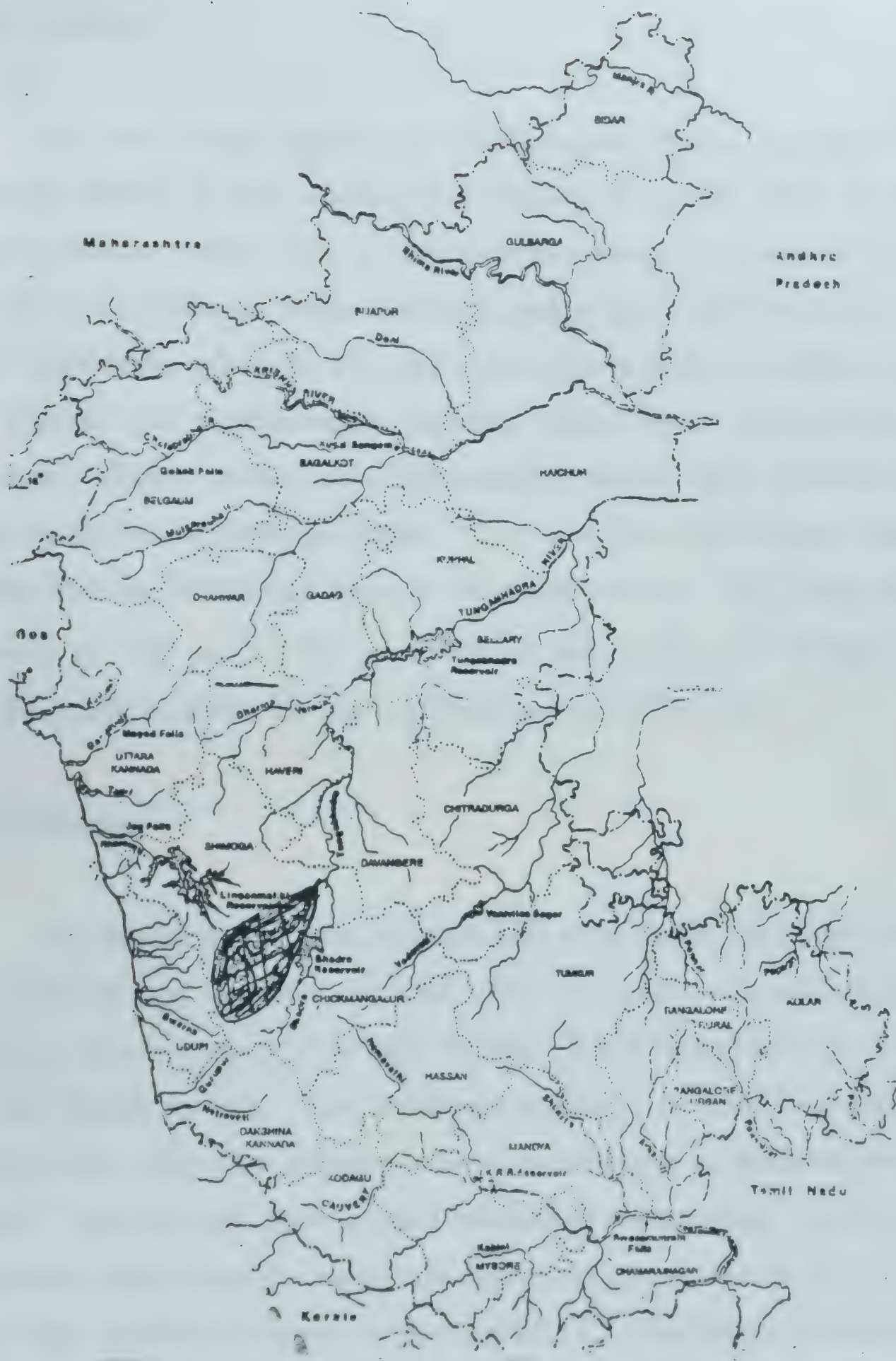


Fig 1. Map showing the study area.

3.1.1 Location

The river Tunga originates in Chikkamagalur district and runs towards Shimoga district. It joins another river Bhadra at a place called Koodali in Shimoga district, further runs as Tungabhadra towards the north of Karnataka and joins river Krishna. Tunga catchment area is under the river Krishna Basin and Tungabhadra sub basin. The area under study is located in different talukas of Shimoga and Chikkamagalur districts. Major places included are from Shringeri, Koppa talukas of Chikkamagalur district and Thirthahalli and Shimoga talukas of Shimoga district. The area has certain issues, which are unique and are considered because of special interest. The study area lies between 13 ° 00' and 14 °00' north latitude and between 75° 00' and 76° 00' east longitude, in about the mid-south western part of the state.

3.1.2 Climate:

The climate of this area, a greater part of it, which has a hilly terrain, is on the whole very agreeable and cool. The cold season is from December to February, which is one of clear light weather. It is followed by hot season that is from March to May. The Southwest monsoon is from June-September. October and November constitute the post-monsoon or retreating monsoon season. After January, there is rapid increase of temperature. April is usually the hottest month with the mean daily maximum temperature at 35.8 C and the mean daily minimum temperature around 22.2 C. Cloudiness decreases in the post monsoon season. Winds are generally light in the district with some increase in force during the monsoon season. The rainfall is very heavy in the region of the Western Ghats. The average rainfall (annual) in these places is

about 1600 -3000 m.m. On an average there are 80-120 rainy days (i.e. days with rainfall of 2.5mm to 10 cents or more) in year.

3.1.3 Topography:

The greater part of the area taken for the study lies in Malnad. The western portion with its tropical forests and mountains presents superbly enchanting natural scenes. The areas are having the altitude of about 610 –800 mts. The study area rests upon the Western Ghats, called the Sahyadri, which is a mountainous area. The interior part of the study area is crossed by a chain of hills running from Mandagadde (a bird sanctuary), on the Tunga. Topographically it is spread in different altitudes, its elevation has made the surface to different uses. The study area is a beautiful scenic place and has natural attraction (Plate –1). The low laying areas are under paddy cultivation with a background of forested area, this feature specially adds to the drainage and run of water to streams (Plate –2). A considerable area has been converted by deforestation to mono-cropping estates for tea cultivation (plate-3). The ecological sensitivity has changed due to surface cutting due to mining in Kuderemukh area. The open surface caused due to the mining activity has increased erosion (Plate –4).

3.1.4 Ecological context vis-à-vis Vegetation:

Tunga River flows in western ghat area, which is a rich reserve of natural habitation of various living beings. The stream runs across by cutting the forest and drains towards north by creating small falls (Plate 5 and 6). The area is very rich biologically and an important places of the state. As it is this



Plate 1: The beautiful scenic place of natural attraction in study area.



Plate 2: A typical cultivated area in the catchment - specially add to the drainage and run of water to streams.



Plate 3: Estates for tea cultivation converted by deforestation to mono cropping in catchment area.



Plate 4: The open surface mining in the Tunga river catchment area-The ecological sensitivity Kuderemukh area.



Plate 5: Tunga river running across the forested area.



Plate 6: Tunga river has small water falls in its way of journey

sensitive places of the state. The places that are in the catchment are most important as a source of running water for the major rivers of the state.

Also, the deciduous forest is found in the extreme north and also to the east. Hence the vegetation of the area finds a suitable role to play in sensitizing the place with its important harvest rain and as a source of woods and minor forest products. The richness of the vegetation is seen with some of the important trees found in this area. Some of the trees commonly observed in the area are listed as follows:

<u>Sl.No.</u>	<u>Scientific Name</u>	<u>Local Name</u>
1.	<i>Albizzia lebeck</i>	Bage (Dodda hombage)
2.	<i>Albizzia odoratissima</i>	Bilwara
3.	<i>Alstonia scholaris</i>	Madale, hale, kadusale
4.	<i>Anogeissus latifolia</i>	Dindiga
5.	<i>Anona squamosa</i>	Seetaphala
6.	<i>Anthocephalus cadamba</i>	Kadavala, kadubale
7.	<i>Aporosa lindleyana</i>	Sali(chella)
8.	<i>Areca catechu</i>	Adike
9.	<i>Artocarpus hirsuta</i>	Heb-halasu
10.	<i>Artocarpus integrifolia</i>	Halasu
11.	<i>Artocarpus lakoocha</i>	Vate, wonta
12.	<i>Azadirachta indica</i>	Bevu
13.	<i>Bassia latifolia</i>	Ippe
14.	<i>Bischofia javanica</i>	Gobbaranerlu, Nilimara
15.	<i>Bombax ceiba</i>	Kempu-booruga, Buruga
16.	<i>Calophyllum elatum</i>	Surhonne

The following table shows the results of the experiments conducted on the various specimens of the material under investigation. The specimens were prepared in accordance with the standard procedure and were subjected to the various tests as described in the preceding section. The results are given in the following table:

Specimen No.	Material	Test	Result
1	Steel	Tensile	80,000 lbs.
2	Steel	Compression	100,000 lbs.
3	Steel	Shear	60,000 lbs.
4	Steel	Bending	120,000 lbs.
5	Steel	Torsion	40,000 lbs.
6	Steel	Impact	10 ft.-lb.
7	Steel	Hardness	100 HRC
8	Steel	Welding	Good
9	Steel	Corrosion	Good
10	Steel	Fatigue	10,000 cycles
11	Steel	Creep	10,000 hrs.
12	Steel	Thermal	1000 F.
13	Steel	Electrical	100 ohms
14	Steel	Magnetic	100 gauss
15	Steel	Acoustic	100 db
16	Steel	Optical	100 nm
17	Steel	Chemical	100 g.
18	Steel	Biological	100 cells
19	Steel	Environmental	100 years
20	Steel	General	100% pass

<u>Sl.No.</u>	<u>Scientific Name</u>	<u>Local Name</u>
17.	<i>Calophyllum wightianum</i>	Kirihonne
18.	<i>Canarium stricutm</i>	Kaidhupa, Raldhup
19.	<i>Caryota urens</i>	Bagni
20.	<i>Cassia fistula</i>	Kakke mara
21.	<i>Cinnamomum zeylanicum</i>	Dalchini
22.	<i>Cocos nucifera</i>	Tenginamara
23.	<i>Dalbergia latifolia</i>	Beete
24.	<i>Dillenia indica</i>	Kanaglu
25.	<i>Eugenia utilis</i>	Hemerle
26.	<i>Ficus glomerata</i>	Attimara
27.	<i>Ficus tsiela</i>	Bili-basri
28.	<i>Hard wickia binata</i>	Kamra
29.	<i>Ixora parviflora</i>	Gorvi
30.	<i>Lagerstromia lanceolata</i>	Nandimara
31.	<i>Mangifera indica</i>	Mavu
32.	<i>Melia composita</i>	Heb-bevu
33.	<i>Mesua ferrea</i>	Nagsampige
34.	<i>Michelia champaka</i>	Sampige
35.	<i>Murraya koenigii</i>	Kari-bevu
36.	<i>Myristica malabarica</i>	Kanagi
37.	<i>Pongamia pinnata</i>	Honge
38.	<i>Pterocarpus marsupiu</i>	Honne
39.	<i>Santalum album</i>	Gandhada mara, sriganda
40.	<i>Sapindus laurifolius</i>	Antavala

<u>Sl.No.</u>	<u>Scientific Name</u>	<u>Local Name</u>
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41.	<i>Shorea talura</i>	Jalari
42.	<i>Syzigium cumini</i>	Nerale
43.	<i>Tectona grandis</i>	Teak, Saguvani
44.	<i>Terminalia paniculata</i>	Honal(bili matti)
45.	<i>Terminalia tomentosa</i>	Matti(kare matti)
46.	<i>Vitex altissima</i>	Nauladi(bharangi)
47.	<i>Xylia dolabriformis</i>	Jambe

(Source Karnataka state Gazetteer: 1.Chikkamagalur and Shimoga District

1975)

Fauna

The study area has hosted good habitation for a good number of wild fauna. The mammals such as Tigers, leopards, barking deer, wild pigs, black monkeys, jungle cats, bears, red squirrels and porcupines are found in the forested area of the study area. A good number of species of birds are found in the woods. Among the important species are sparrow, vulture, kite, pigeons, peafowl, jungle fowl, woodpecker, myna, kingfisher, crow, etc. Over 400 species are found in the tanks and other water bodies. Among the reptile species, tortoise and chameleon is found in forested area. Snakes are found in large numbers, green snake, cobra, viper are met in all parts of the taluk. Frogs among the amphibians are in good numbers (Karnataka State gazetteer, Shimoga district, 1975).

The first part of the paper discusses the importance of maintaining accurate records of all transactions. It is essential for the company to have a clear and concise system in place to ensure that all data is properly recorded and stored. This will allow for easy access and retrieval of information when needed.

The second part of the paper focuses on the importance of regular communication and reporting. It is crucial for the management team to stay informed about the company's financial performance and to provide regular updates to the board of directors.

Conclusion

In conclusion, the paper highlights the importance of maintaining accurate records and regular communication. By implementing these practices, the company can ensure that it is always up-to-date on its financial performance and can make informed decisions based on the data. This will ultimately lead to a more successful and profitable business.

The author would like to thank the board of directors for their support and guidance throughout the process. It is their leadership that has made this project possible and successful.

3.1.5 Drainage Streams:

The entire portion of the study area falls under Krishna basin. The actual study area is under Tunga basin. The river Tunga rises in the Western Ghats at Gangamul (1,199mts) high in the Varahaparvatha in Chikamagalur district close to the twin stream the Bhadra. At first, Tunga rivers course is northeast part Sringeri to Baggunji where it turns northwest and continuous in the same direction till it reaches Thirthalli taluk. Further it flows to Shimoga taluk through Bhadravati taluk to meet Bhadra forming Tungabhadra at Koodali.

Further the selection of personnel; events and the activities in the place selected for the study are given below.

3.2 Sampling Procedure & Methods of data collection

3.2.1 Selection of Personnel: In order to collect comprehensive data, regarding the environmental information and their options for concerns a Delphi type of opinion survey was carried out. Selection of varied array of people in the study area was selected based on their profession and involvement in the environment of their locality. PRA method that has been explained bellow was followed to get the public contact. The information was generated by pre-tested questionnaire given as annexure – I

Delphi type of Study: A qualitative approach in guiding the development of EIMS could be characterized by individual and/or group perception of matters

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of environmental concerns and environmental indicators. A quantitative ranking on the environmental concerns developed may be followed by overlapping the perception on the Knowledge discovery. The Delphi type of study is conducted involving the different individuals and groups/institutions. These individuals include Scientists, Doctors, Engineers, Industrialists, Farmers, Teachers, Management personals, Students, Businessmen, Journalists, Social thinkers, and Housewives. The individual group will have a minimum sample size of 20, so that over 200 samples of perception on the concerned ideology was obtained.

PRA method: A methodology of participatory approach will be adopted for observation of the descriptive studies on the case studies and with the environmental movement areas. A special interest of the human meaning and interaction as viewed from the people who are insiders of the particular setting will be adopted. A logical process of inquiry that is open ended, flexible, and consists of redefinition of what is problematic, etc on the facts in the settings of human interference are adopted in the study. Ultimately, the methodology of participatory observation aims in generating practical and theoretical truths based on human life grounded in the realities of environmental concerns.

3.2.2. Selection of Events and activities: There were several events and activities indicative of the environmental information sources and the involvement of people in generating or using of the information. Such events and activities were indicative of the environmental information sources; they were selected based on the information gathered during the field visits and case studies. In each of this activities core indicators were utilized in selection.

Core indicator approach: Several indicators contribute to any database. Environmental aptitude and concerns itself have a definite set of approach, and perception on the data indicate the availability and management. The core indicators of the data handling are envisaged by the different approaches and they will be adopted. However these core indicators are chosen with specific criteria set by the historical/research perspective of the environmental studies. This will have the issues that contribute to the sustainability of the setting in general.

3.3 Case Studies: In this context it is proposed to make a case study on the quantitative approach however, covering all the aspects of qualitative approach. Case studies especially on the impacts of Environmental information management on the sensitive areas are conducted. Two such case studies are planned and are conducted in the area of catchment of River Tunga.

These case studies include:

- 1) Impact of environmental information response on the environmental concerns through the Environmental movements in disturbed areas of River Tunga catchments.
- 2) Western ghat biodiversity network and its information concerns on environmental conservation.

3.4 Operational definitions

Environmental concerns (Knowledge discovery): A study and documentation of data response through the knowledge perception or

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environmental concerns. This will follow a core indicator approach and how people rank these indicators and how far they can appreciate the environmental concerns.

Research perspectives: This is studied by analyzing selective documentation of the environmental concern in different journals related to studies of Karnataka's environmental issues. Few, well known journals published from Karnataka will be taken as resource base for the study of research perspectives of environmental concerns. Minimum of 10 journals will be considered and taken since their inception or since 1972 (The Stockholm summit) till date.

Historical perspectives: This is studied by analyzing the historical event of environmental issues of selective documentation on the environmental concern in different journals related to studies of Karnataka's environmental issues. Few, well known journals and other publication such a state of environment reports, etc. published from Karnataka will be taken as resource base for the study of research perspectives of environmental concerns. Historical development of the environmental concerns will be considered and taken since 1972 (The Stockholm summit) up to date.

Developing the EIMS: An opinion survey, based on Qualitative approach for development of EIMS was characterized by individual and /or group perception of matters of environmental concerns and environmental indicators. A quantitative ranking on the environmental concerns developed may be followed by over lapping the perception on the Knowledge discovery. The study will include individuals and groups/institutions. These are concern ideology selected from various parts of the state and over 200 samples of

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perception on the concern was obtained and utilized to develop Environmental Information Management Systems.

3.5 Practical Utility of the Study:

The project will come out with an analytical understanding of the Environmental Information handling in evolving the concerns. It is proposed to develop the optional Environmental Information Management Systems (EIMS) for wider use and applications in Karnataka. It is hoped to come out with the strategies for the concerns by environmental auditing in sensitive areas and aimed to build public perception data bank on environmental conservation.

Pilot Study

A pilot study was conducted in the study area and associated neighboring places. Sufficient initial fieldwork was carried out and informal discussions were conducted with few individuals who were having sufficient insights with the study area as well as the environmental issues. Based on the experience thus gathered in the field and by getting acquainted with the dynamics of the ecological and environmental knowledge systems, three semi-structured interview schedules were developed. Pilot study was conducted outside the research area and its results were excluded in the final study.

3.6 Pre-test

Based on the objectives and aims set, different tools were adopted. The tools used in the study were pre-tested and wherever necessary, certain

modifications were carried out. The results of the pre-test were not included in the study.

3.7 Constraints to the study

Study being conducted in an area, which is ecological sensitive, and people of emotional personality, getting acquainted with was the initial constraints. Repeated visits were required for gathering information, from the people of the study area. Poor transport facilities to many villages, especially to the remote villages. (Initial difficulties faced due to reluctance of people to give proper information). People were suspicious as to what would happen if they disclosed the information. Unfavorable field conditions for the observation of certain field activities given by the peoples were due to the problem of reach.

3.8 Analysis: The data obtained from interviews of people and participants as well as the case studies of study area analyzed by frequency and percentages.

RESULTS & DISCUSSIONS

IV. RESULTS AND DISCUSSION

A study on perception of environmental information management for ecological concerns in river Tunga catchment area has been envisaged. As already explained in methodology a Delphi type of study that is opinion survey across the people of the study area covering the different section of people was carried out. Case studies on the environmental concerns through the Environmental movements and the Western Ghat biodiversity network concerns in the study area were also conducted. The results obtained are presented, depicted and discussed for the development and application of environmental information management systems and the appropriate discussions are presented here with different titles as given below.

4.1 Environmental Information Management for Ecological Concerns

- 4.1.1. Public perception on Environmental information management**
- 4.1.2 Peoples opinion on ecological concerns**
- 4.1.3 Environmental Information Management options**
- 4.1.4. Ecological Issues for concerns: Development and actions**
- 4.1.5. Strengths & weakness of the information management systems**
- 4.1.6. Environmental Information Management System.**

4.2 Case Studies

- 4.2.1 Impact of environmental information response on the environmental concerns through the Environmental movements in disturbed areas of river Tunga catchment.**

4.2.2. Western Ghat biodiversity network and its information concerns on Environmental conservation.

4.3 Environmental information management systems for ecologically sensitive area.

4.4 Future line of work

4.5 Conclusions

4.1 Environmental Information Management for Ecological Concerns

The most important feature of the study was to envisage the environmental information management through which the ecological concerns were to be developed. The different facets of environmental information management, which were experienced by the people of the area included, land, water, and air as a major resources which are under threat. The specific issues and the concerns were also taken while developing the data in to discussion. A detailed survey in the study area was conducted, that included 200 responses. Schedule has been given in Annexure I and the consolidated data in Annexure II. The study pertaining to this covered entirely ways and means of genesis of environmental information and the responses for the knowledge discovery, that has created awareness among the people.

4.1.1. Public perception on Environmental information management

A qualitative approach in guiding the development of EIMS was characterized by individual perception of matters of environmental concerns and environmental indicators. The Delphi type of study was carried out in the study

Table . 1. Social Cultural details of people contacted for information on environmental information management for ecological concerns

Respondents	Age	Marital Status	Education	Gender Ratio (Male: Female)
1. Farmers	40-75	All married	5 th -Graduate	8 : 2
2. Business people	28 –60	16(M) 4(UM)	5 th -Graduate	10 : 0
3. Students	15 –22	All Unmarried	10 th -Graduate	6 : 4
4. Housewives	25 –55	All married	10 th - Post Graduate	0 : 10
5. Teachers	30–55	All married	Graduate	6 : 4
6. Scientists (<i>Science Lecturers</i>)	28 –50	All married	Post Graduate	7 : 3
7. Professionals (<i>Doctor, Engineers, etc.,</i>)	30 –65	All married	Graduate	8 : 2
8. Social workers	30 –60	16(M) 4(UM)	Graduate	8 : 2
9. Artisans	25 – 55	All married	5 th – Graduate	10 : 0
10. Working ladies /College girls	16 – 25	All Unmarried	Graduate	0 : 10

Total Number of Respondents = 200

A quantitative ranking on the environmental concerns developed as perceived by the insiders and as well studied through case studies were recorded for the perception of Knowledge discovery.

The people's profile included farmers to professionals, social thinkers to scientists, Artisans to students and housewives. The average ages of the people included 15 to 75, indicated the coverage of 60 years difference in experience, a normal Indian age, said to be life achievement. It also considered the young perception to the experienced. A good gender ratio of 6.3 : 3.9 (126 males and 74 females) was considered in the study.

People's response on Environmental information management: People's response on information management has been presented in Table. 2. Preference of environmental information in the Tunga catchment area was found, as majority preferred the land as more important. The data obtained has been depicted in Fig. 2. Peoples' response on the source and interest of environmental information has some dynamics that has been carefully taken during the study.

Table. 2. People's response on Environmental Information management in study area

I. Preference for Environmental Information

Land	134	(67 %)
Water	60	(30%)
Air	6	(3%)

II. Source of Environmental Information

Oral	38	(19%)
School/College	16	(8%)
Books	121	(60.5%)
Public Contact	25	(12.5%)

III. Interest on Environmental Information

Casual	13	(6.5%)
Duty	24	(12%)
Right	163	(81.5%)

(Total Number of respondents = 200)

67 % of the people of the Tunga catchment area preferred land related information. For the majority of people, land meant a major supporting factor, the other prime issues such as vegetation, forest, gardens and animals every thing included under land. This eco -sensitive zone of Western Ghat land is most precious and threatened, mainly because the catchment area disturbances includes, mining and land related aspects.

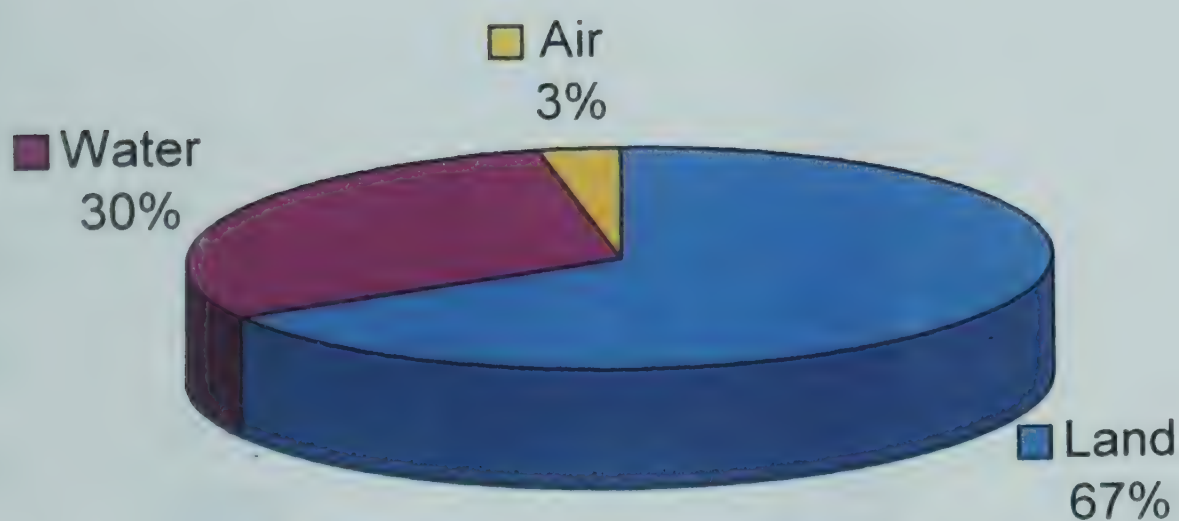
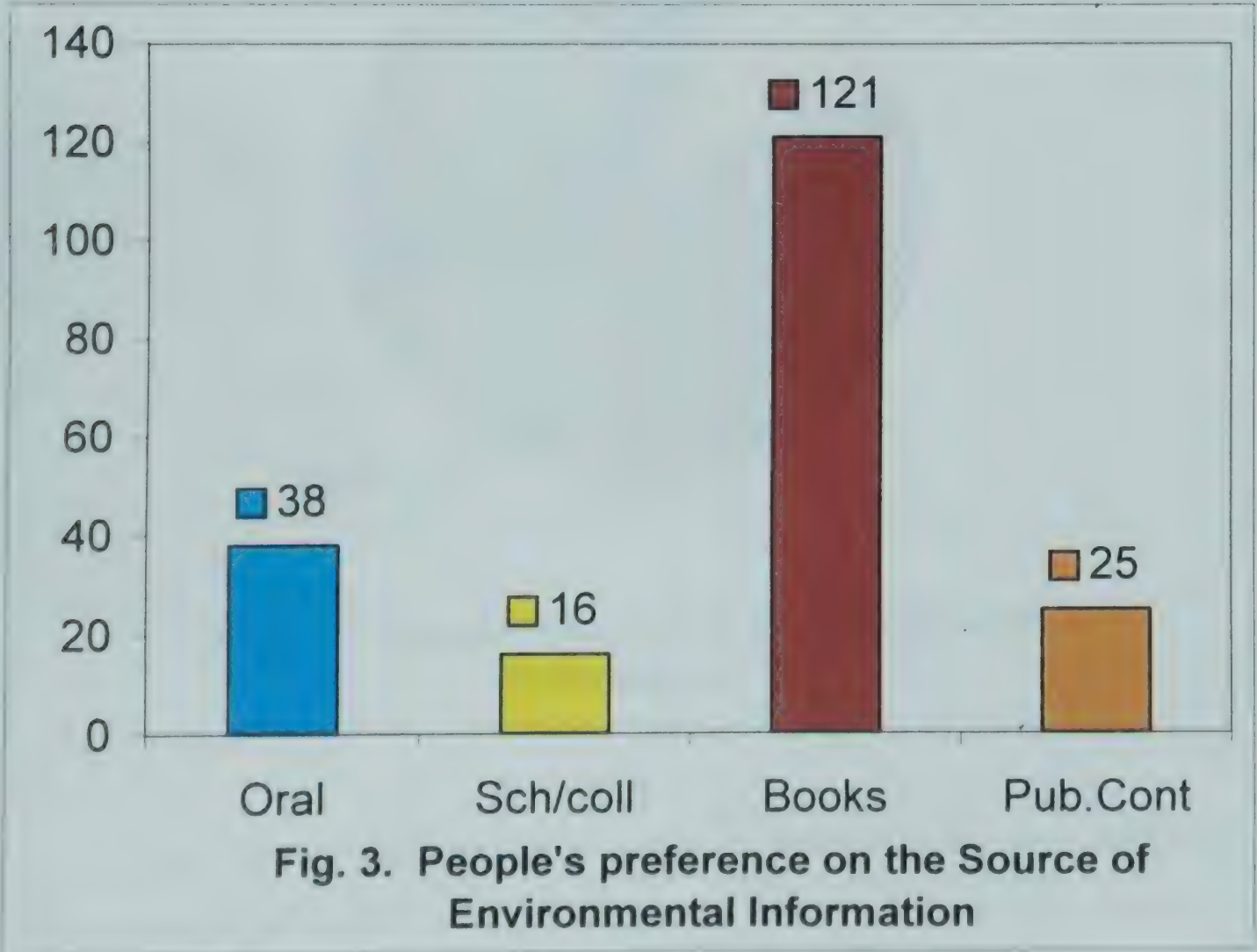


Fig. 2. People's preference for environmental information

The other responses such as water and air were preferred as 30 % and 3 % respectively. Perhaps the entire area particularly the place under habitation poses clean air. At the same time 30 % of response on water was due to Save

Tunga movement, which has additional details in the case study on environmental movement in the study area.

The source of information on environment in the study area included, oral knowledge to several published books etc. The data obtained on source of their information has been presented in Table 2, and depicted in Fig. 3. Majority of the people depended for information on books (60.5%). There was a minimum response on schools and colleges as a source of environmental information. Public Contact and oral sources were 12.5% and 19% respectively, bearing a considerable share of information.



People's interest on environmental information envisaged as casual, duty and right are presented in Table .2 Fig. 4 represents the response of public interest on Environmental Information. As many as 81.5% of the respondents, felt their interest on environmental information was their right. However, very few responses of 6.5% resulted as casual interest.

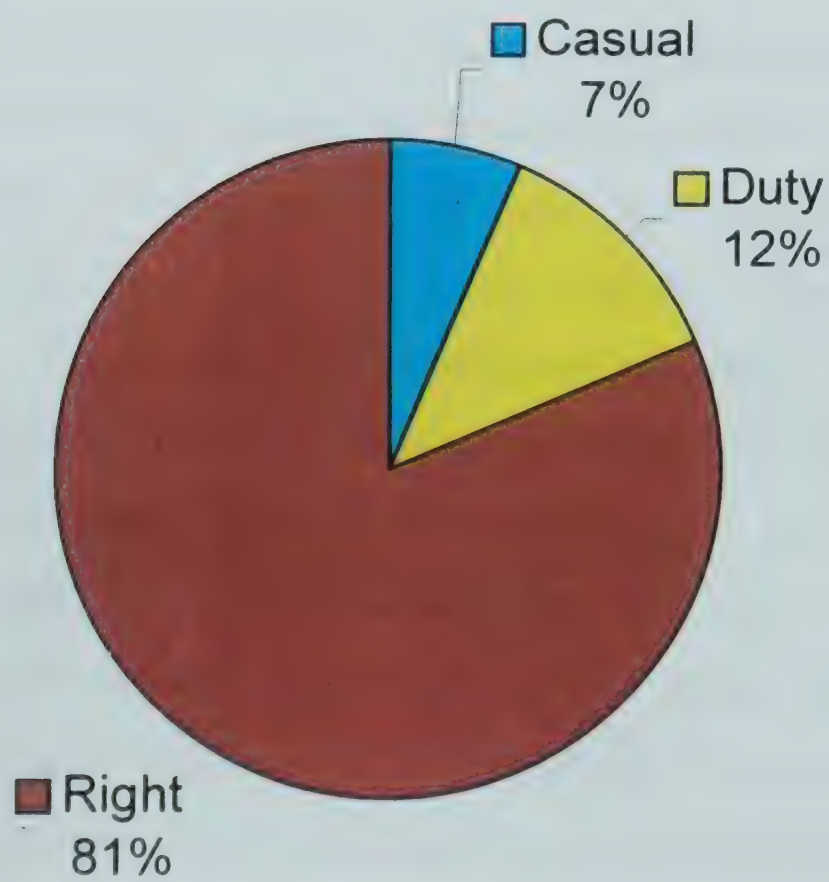


Fig. 4 People's Interest on Environmental Information

It was found that a large number of respondents were interested in environmental information as their right to know. It was also found that a majority of them depended on books. It is opinioned that, interest on environmental information was their right and their good source as books

shows the public interest in this sensitive zone. Environmental information management utilizes considerable literate ventures since, people feel knowing information was their right and they obviously search and manage to get the source. Studies revealed that a management pattern on information right and access plays a major role in developing the concern, which they were aimed at. Dunlap (1982) reported a similar opinion in Public Opinion and Environmental Policy, supports the issue which are envisaged here.

Participatory management in environmental information: People of the area have tremendously experienced the ecological issues and information management options of Tunga, one of the major river that takes its birth and runs in the Western Ghat area. The rivers attachment to public is quite influential. It was not only as source of natural water reservoir that serves them perennially, but also the emotional attachment as they have seen through out their lifetime. The entire area of the surveyed place has rich source of vegetation and scenic places, people's habitation were actually covered with these ecological sensitivity and beauties (Plate .1). People's sensitiveness was such that their habitation and source of their bread was important so their responses in management of information was participatory and experience based.

How they managed the issue of ecological sensitiveness? As student of information science the data reveled to be of their own skills and their exposure of interests. They have utilized the experience of their habitation land and associated afforested area, etc for their perception. As a natural source of this ecological habitation they experienced, they owe their respect to it. Land for them is everything, meeting not only their requirements but also their life in it.

People of the study area as well in any environmentally sensitive place, participate in the public issues concerned with environment depending on the their awakened interest on environment. Perhaps they use different mechanism and ways for the response. But it has essentially depends on how they are exposed to information or the access of information. Variety of issues, act on the decision of people on this aspect. The detailed version of the enquiry made in this regard has been provided. The information recorded on their actual participation or experience of handling environmental information management has been presented in Table. 3.

Handling of environmental information pertains to their use of skills in knowing information, environmental sensitization of their place, and such factors accounts to management aspects. Environmental situation of their natural resources such as land water and air were the prime elements upon which situational management is realized. However the study area has been an important place of biological interest, being one of the eighteen hot spots of biological diversity of the world, the vegetation and forest were also the important ones. But for people's general interest, the land -included vegetation. They generally did not separate land and forest. For some people forest is everything; they even feel the water is also from forest. Forest bring them rain, wealth and prosperity, they have a divine feeling towards the land vis-à-vis forest. As such these forested areas were also called as tropical rain forests. They receive heavy rains during the summer. They consider this issue while their decisions on any of the land related aspects.

Table . 3. People's actual participation in environmental management

I. Use your own skills or information			
Yes	200	(100%)	
No	0	(0%)	
II. Environmental Situation			
Land	129	(64.5%)	
Water	69	(34.5%)	
Vegetation/ forest	2	(1%)	
III. Participation Experience			
Excellent	58	(29%)	
Very good	3	(1.5%)	
Good	106	(53%)	
Moderate	21	(10.5%)	
Poor	12	(6%)	
IV. Need for updating information for Management			
Yes	200	(100%)	
No	0	(0%)	
V. Important Management type			
Public Awareness	188	(94%)	
Local Data Base	0	(0%)	
Personal Data Base	0	(0%)	
By Administration	12	(6%)	

(Total Number of respondents = 200)

4.1.2 Peoples opinion on ecological concerns

Environmental aptitude and concerns itself have a definite set of approach and perception of the data indicate the availability and management. The core indicators of the data handling are envisaged by the different approaches that will be adopted. However these core indicators are chosen with specific criteria set by the historical/research perspective of the environmental studies. This will have the issues that contribute to the sustainability of the setting in general.

PRA Method: A participatory approach was adopted for observation of the descriptive studies on the case studies and with the environmental movement areas. A special interest of the human meaning and interaction as viewed from the people who are insiders of the particular setting will be adopted. A logical process of inquiry that is open ended, flexible, and consists of redefinition of what is problematic, etc on the facts in the settings of human interference are adopted in the study.

Ultimately, the methodology of participatory observation aims in generating practical and theoretical truths based on human life grounded in the realities of environmental concerns. It aimed at understanding development of ecological concerns and their associated aspects. Ecological concerns were evolved not only due to their place of belonging, but also the habitation of life as well their pride of the place hosted for interesting living beings.

Ecological concerns were measured by inquiring the development as well its impact due to other factors. Further was studied the sources for development and the rate of development. Table 4 provides the details.

Table 4. People's response on impact of Environmental information management on Ecological concerns

I. Development Environmental concerns

Yes	200 (100%)
No.	0 (0%)

II. Rate the environmental concerns development

Excellent	20 (10%)
Good	161 (80.5%)
Moderate	10 (5%)
Poor	9 (4.5%)

III. Ecological issues attributed through EIM

Better life	28 (14%)
Climate	4 (2%)
Health	15 (7.5%)
Food Security	37 (18.5%)
Economy	2 (1%)
Safe water	86 (43%)
Property	1 (0.5%)
New generation	11 (5.5%)
Clean breath	11 (5.5%)
Habitation	5 (2.5%)

(Total Number of respondents = 200)

Development Environmental concerns: Table 4 provides the development details of ecological concerns. It was not surprising that everybody were of the opinion that the development of ecological concerns has been with them. 100 per cent acceptance for development was obtained on inquiry.

Rate the environmental concerns development : The rate of ecological concerns developed amongst the people of the study area has been given in Table 4. and depicted in Fig. 5. Majority of them (80.5%) opined that the rate of development as good. Very few Viz. 4.5 % opined that poor development was evolved. However 10 percent of them agreed upon the development as excellent with 5 percent as moderate development.

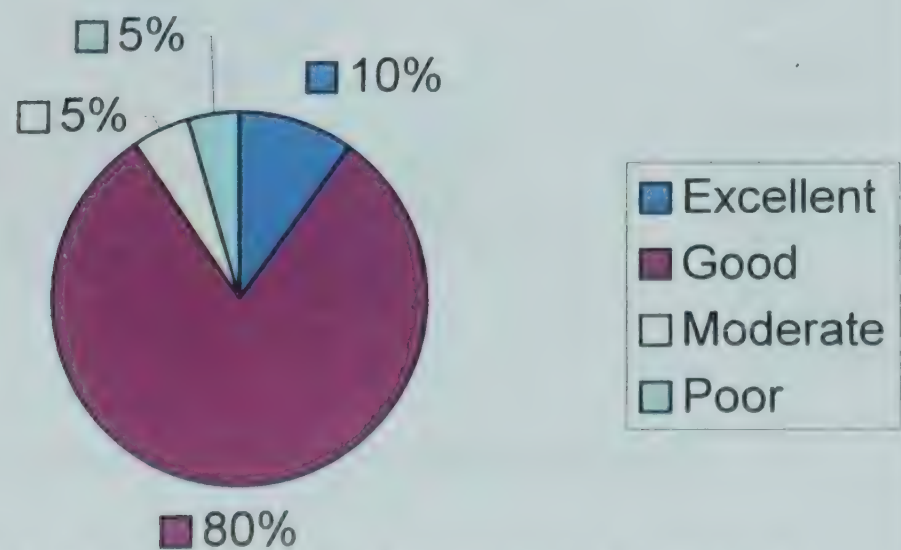
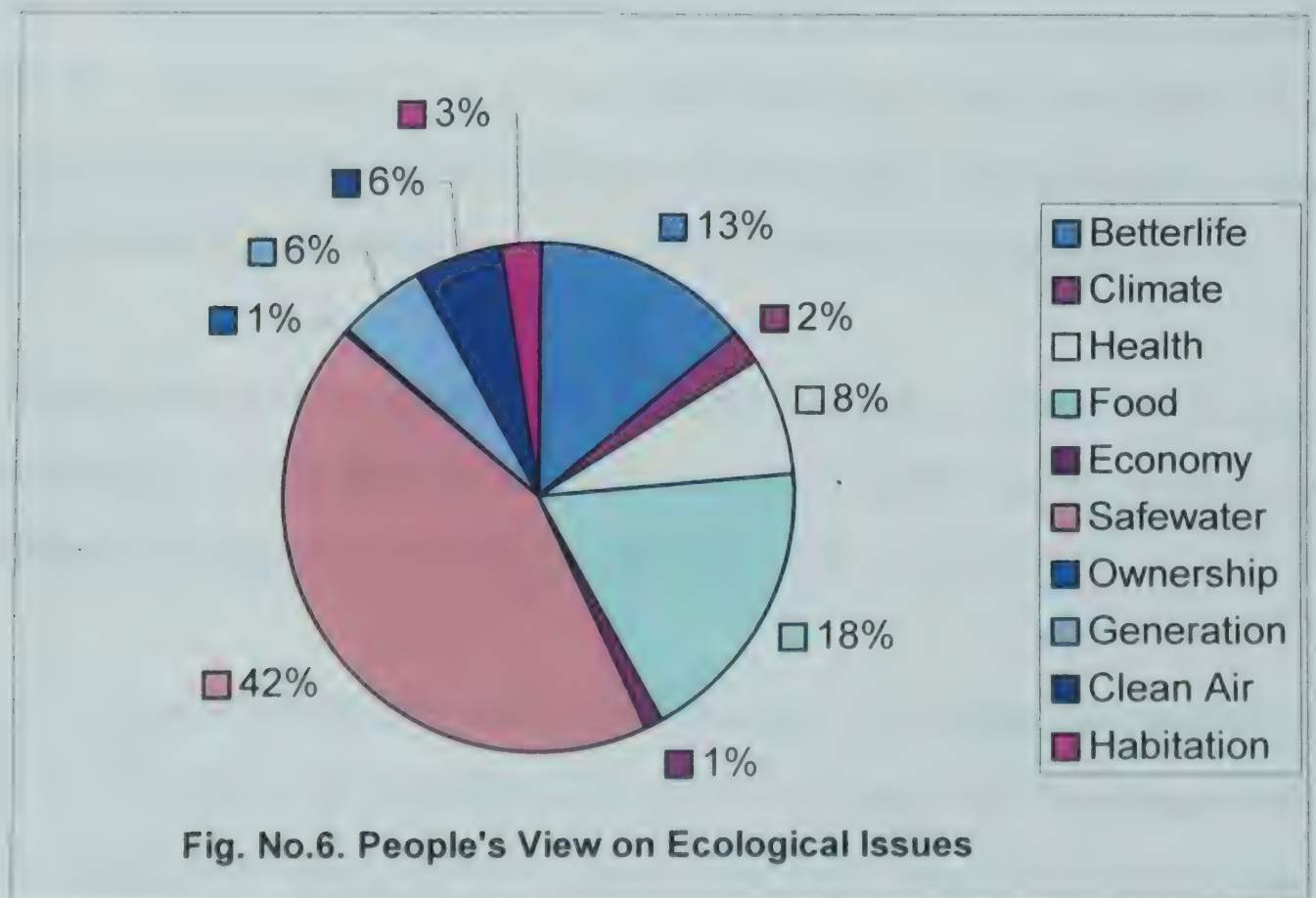


Fig. 5. People's Rating of the Environmental Concerns

Ecological issues attributed through EIM: Development of ecological concerns was attributed to environmental information management. It was explored by understanding their opinion as their wanting for life such as Better life, Climate Health, food Security, Economy, Safe water, Property, New generation and Clean breath. The details of the response are given in Table 4. The details were in the order of Safe water (43%) Food Security (18.5%) Better life (14%) Health (7.5%) New generation (5.5%) Clean breath (5.5%) Habitation (2.5%) Climate (2%) Economy (1%) Property (0.5%). The following figure depicts the people's version.



Safe water, Food, security and health with better life amounts their overall ecological concern. It was further understood and given in case studies that the entire awareness movements were evolved due to water related aspects.

Yet another reason was that, if a small disturbance in environment was resulted in water properties this was the response. Property ownership could have been, as a selfish response and was not responded. This clearly shows that the Environmental Information Management has played its role in this sensitive area.

4.1.3 Environmental Information Management

Actions for EIM : Several ways of expression were generally seen as the actions of environmental management. Most common one seen and attributed for quite some time during the late 70s and early 80s was the emotional response. But as the movement on the concerns attained maturity the way has changed to certain extent. As a result we now only have authorities and government machineries to monitor the environment and ecology aspects. The pollution control board, which monitors the assigned geographical area.

Along with such monitoring the ecological clearance and environmental concerns need to be full filled by the industries and establishments. Ministry of environment and forestry plays the specific role on these aspects.

People's actions on environmental disturbances: Generally the people are the first and fore most individuals of the given area where the disturbance was seen. The responses could be different from emotional response to initiate legal responses. Table 5 gives the details of such indicators. It was indicated that public action could be one of the important action. As the people were not given any right on such matters they were expected to give responses that may not be individual actions.

Table 5. People's response on Actions for Environmental information management on Ecological concerns

I. What action you prefer to execute while on ecological concerns to be taken:

Emotional expression	2 (1%)
Public action	118 (59%)
Protest	51 (25.5%)
Move with the mass	6 (3%)
Write to authorities	23 (11.5%)

II. Methods of Execution of your action:

Individual	16 (8%)
Group	184 (92%)

III. What do you know any of the systems to be useful by conserving it for future.

Yes	200 (100%)
No.	0 (0%)

(Total Number of respondents = 200)

Fig 7. Depicts the public response on the action on ecological concerns. The response for execution of certain actions is indicated.

As indicated in Table 5 the methods of execution of actions and the response was understood are group response. They were also hope full that these actions will help in conservation of the environment.

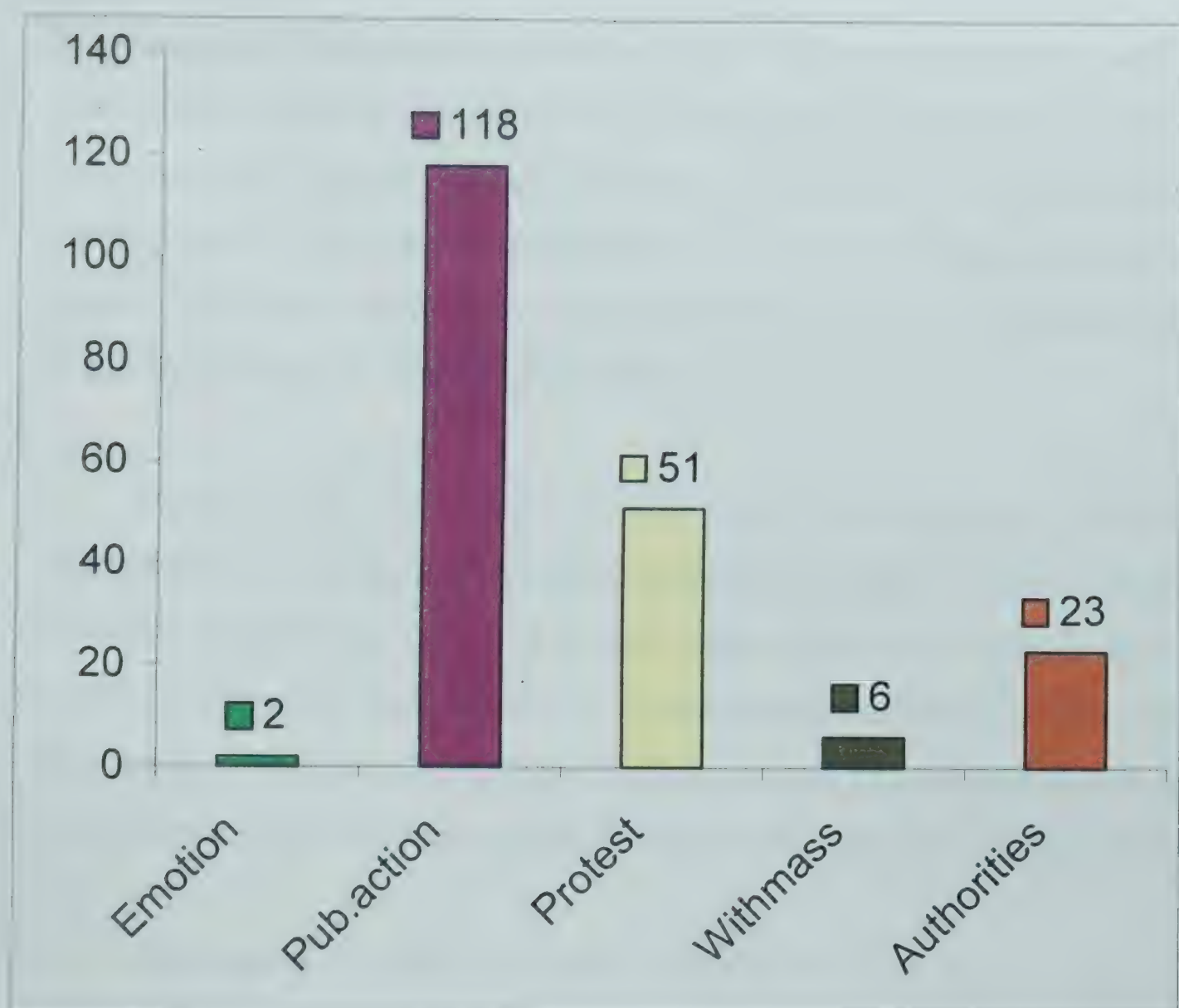


Fig. 7. People's preference of action on Ecological Concerns

People of this area are aware of the movement in conservation and have experienced the action in return. As the public administration's role is the major and also the people's strength in democratic set up are known to them they have good response on these issues. Public action in every environmental movement has been an important agenda and has always been played in development of ecological concerns.

Environmental Information Management : The most important part of this study in this area was the information management. Information pertains to environment of the area and has several ways of generation and dissemination. But the public version and their reaction of way that is being handled were of interest. The study was made to understand the information management and its role in evolving the ecological concerns.

Hence it was hypnotized to realize the importance of information management in building the ecological concerns. Ecological concerns may vary differently for different people, but their ultimate interest in conservation was overall protection of their habitat. In global agenda also if the people realized the aspects of conservation as their habitat, it was emphasized as the target meet. Hence in that sense ecological development was taken under this study.

Information to public had many realities. It was not just a fact as the researchers interest, but it included such information along with their media exposures. As many of them were land holders their experience of handling land record were their typical reaction of information handling. Most of these responses included the very poor response of the public administration in giving the information. Therefore the study on the specific aspects of difficulties, strengths and environmental information of public opinion was conducted. This specific enquiry was, to make the management options on information pertaining to environment and the specific attention for action has been understood while aspiring for this study. Table 6. Provides such details on various issues on environment information management.

Table 6. Public opinion on difficulties, strength and attention of environmental information management for ecological concerns in Tunga Catchment area.

I. Difficulties in the Environmental Information Management

Collection of information	166	(83%)
Sharing	14	(7%)
Access	15	(7.5%)
Updating	5	(2.5%)

II. Strengths of Environmental Information in developing the ecological concerns

Conservation	48	(24%)
Future security	131	(65.5%)
Ecological attachment	15	(7.5%)
Eco-friendly Life	6	(3%)

III. Attention of management practice

Public	28	(14%)
Institutions	8	(4%)
Government	164	(82%)

(Total Number of respondents = 200)

Difficulties in the Environmental Information Management: Difficulties of information handling for the public were in the order of Collection, Sharing, Access and Updating (Table 6). As many as 83 percent of people opined that the collection of the information itself is difficult. Many expressed that in the access to public sharing of information form, the administration was very poor. Few people were very unhappy, about the treatment to public people from the government people. Some educated class response was that, Indian training in administrating was either by British and monarchy that had provided only imposing the slavery among the public.

Sharing of information and access to information were not realized much to people while on study. It was also the case when the updating was mentioned to them. This could be supported by many of the information access studies conducted by various researchers such as Madhav Gadgil and others who have opined the public access and sharing of information in similar lines.

Strengths of Environmental Information in the ecological concerns : Building ecological concerns through environmental information has been the hypothesis of the study. It has been in any of the process of conservation, ecological security and attachment and Eco friendly life. It has been given in table 6. As many as 65.5 percent of opinions were towards the future security. They were of the opinion that the main strength of the information is to provide the future ecological security; there by, having conservation of nature for better life.

Attention of management practice : Management of the information in practice has to be taken up by the appropriate people or agencies. The detail of this has been given in Table 6. It was natural that people opined that, the government could be made responsible for the management of information on environment and also for the practice of these issue for public good. Few have opined some of the exclusive agencies such as institutes for management of information.

In a democratic set up its people opt government to be responsible for the public action. However they would choose the government, their options towards the actions and responsibilities generally with the administration.

4.1.4. Ecological Issues for concerns: Development and actions

Ecological issues for public understanding have been taken as they feel their habitat or environment. These issues originated as natural resources and their conservation. After Rio summit Environmental concerns came into sharper focus. Since then, there have been diverse changes and far reaching technological developments, with environmental concerns occupying center stage in developed and developing countries. Perhaps the General Assembly of the United Nations by Resolution, to accept to hold major conference on environment and development in 1992 was due the ecological pressure on global scale.

The earlier Brundtland Commission report by the World Commission on Environment and Development were also the resultant effect of meeting the thought processes of Development and Ecological concerns.

How ever in Indian context the environmental clearance by the government of India for the development activities were also the processes that have brought to these realities.

The studies of Mukundan (2002) supports the inferences as the outcome of Rio-Earth Summit (1992) highlights the view that socio-economic development and environment protection are interdependent and mutually reinforcing processes. Therefore during these years it followed to be recognized that regional or local environmental problems, such as extensive urbanization, deforestation, desertification, and general natural resource scarcity, as serious issues in building the security. International recognition of the fact that environmental protection and natural resources management must be integrated with socio-economic issues of poverty and underdevelopment culminated in the 1992 Earth Summit.

Sunita Narain (2002) remarkably objects the post Rio actions as they were dictated by the developed countries and was therefore, one-sided. Further author hopes at Johannesburg, concerns of the poor must come first if we are to build a caring and sharing world. These type of concerns as typically expected by the developing nations.

In Karnataka many agencies including NGOs concerns about the environment of state and understanding of its importance in the developmental efforts have showed increasingly important attentions. Research organizations and informed people in general showed much attention towards the ecological heritage of the state. Recent environmental debates in the state of Karnataka

have focused on ecologically sustainable development. Preservation of biological diversity, land degradation, wasteland issues, water quality decline, ecology sensitive area management, rural sanitation, wild life management, industrial pollution monitoring and urban ecology were shown as a result in state environment reports.

Karnataka is known as a progressive state with its pioneering efforts in promoting environmental conservation and awareness. The resource use and conservation dynamics of the state has captured the attention of all sections of the state, leading to several commendable efforts launched in the state to study. These included mining environments, agricultural surroundings, pollution effects etc. (Ramprasad and Channesh 2000).

In the document of state environmental report, the resource base and environmental concerns involved in developmental activities have been discussed. The academicians, researchers, social workers, administrators and the people have contributed to the cause. The consolidation of such efforts by providing the much needed support to such activities with an organized effort to bring out user-friendly information on the environmental status of Karnataka State is no doubt the need of the hour. The state of environment report will not only be a useful tool for policy makers and administrators but it would also help give direction to developmental efforts in the field of environment. Although there is consensus to conserve our environment, there are very few clear-cut ideas and documentation of experience for use that can help people at large to know how one can go about doing the exercise. It is also observed that general social awareness about environmental conservation is lacking among most of the people who are directly dealing with it

4.1.5. Strengths & weakness of the information management systems

Medha Patkar (2000) writes, the mass social-environmental movements in India are speaking a new language of development that focuses on democratic decision-making and environmentally benign technologies. In India the last three decades have seen the emergence of various movements to save natural resources. These movements led by the empowered sections of the adivasis, peasants, fisherfolk, graziers belonging to the dalit and backward sections and with an encouraging contribution from women are defining the idiom and medium of their struggle. The agenda of these social environmental movements is rooted in the natural based communities who assert their right to life and livelihood.

Historically, environmental research has supported the conservation and has been adding strength by providing information. Research being search of information and truth hence provide a support to the process. Recently, increased understanding of environmental patterns and processes, coupled with the interest in the landscape regional and global patterns and processes has led to the development and funding of studies on a broad scale and in long-term questions.

As a result of the expanding scope of environmental research, developers of environmental databases must now address difficult and diverse issues: the wide variety of data, both spatial and non-spatial, being considered for inclusion; the size and complexity of databases being created; their design, development and utilization; the different spatial and temporal scales of data

collection; increasingly sophisticated analytical requirements; new systems to provide information about and access to databases; and the integration of data from various sources and disciplines. Concomitantly, attention to management of environmental data within scientific organizations has increased. Michner, (1986) studies supports the database importance which have significant contribution in knowledge search.

Environmental education is the process of recognizing values and clarifying concepts in order to develop skills and attitude necessary to understand surroundings. Environmental education also entails practice in decision making and self-formulating a code of behavior about issues pertaining to environmental quality.

4.1.6. Environmental Information Management System:

Historical perspectives of environment information management systems :

The protection of nature and wildlife has a long tradition in Indian history. Wise use of natural resources was a prerequisite for many hunter-gatherer societies, which date back to at least 6000 BC. Extensive clearance of forests accompanied the advance of agricultural and pastoral societies in subsequent millennia, but an awareness of the need for ecological prudence emerged and many nature conservation practices were retained. As more and more land became settled or cultivated, these hunting reserves increasingly became refuges for wildlife. Many of these reserves were subsequently declared as national parks or sanctuaries, mostly after Independence in 1947. Examples include Gir in Gujarat, Dachigam in Jammu & Kashmir, Bandipur in Karnataka,

Eravikulam in Kerala, Madhav (now Shivpuri) in Madhya Pradesh, Simlipal in Orissa, and Keoladeo, Ranthambore and Sariska in Rajasthan.

Wildlife, together with forestry, has traditionally been managed under a single administrative organization within the forest departments of each state or union territory, with the role of central government being mainly advisory. There have been two recent developments. First, the Wildlife (Protection) Act has provided for the creation of posts of chief wildlife wardens and wildlife wardens in the states to exercise statutory powers under the Act. Under this Act, it is also mandatory for the states to set up state wildlife advisory boards. Secondly the inclusion of protection of wild animals and birds in the concurrent list of the constitution has proved the union with some legislative control over the states in the conservation of wildlife. The situation has since improved, all states and union territories with national parks or sanctuaries having set up wildlife wings.

The adoption of a National Policy for Wildlife Conservation in 1970 and the enactment of the Wildlife (Protection) Act in 1972 lead to a significant growth in the protected areas network, from 5 national parks and 60 sanctuaries to 69 and 410 respectively, in 1990. As a result several places have been declared as National Parks and Protected Areas for India and are distributed throughout mainland India and its islands.

The recent developments further strengthened by a number of national conservation projects, notably Project Tiger, initiated in April 1973 by the Government of India with support from WWF and the crocodile Breeding and

Management Project, launched on 1 April, 1975 with technical assistance from UNDP/FAO.

Protected Areas of the Western Ghats

The Western Ghats are a chain of highlands running along the western edge of the Indian subcontinent, from Bombay south to the southern tip of the peninsula, through the states of Maharashtra, Karnataka, Kerala and Tamil Nadu. Covering an estimated area of 159,000 sq. km, the Western Ghats are an area of exceptional biological diversity and conservation interest, and are "one of the major Tropical Evergreen Forest regions in India".

As the zone has already lost a large part of its original forest cover (although timber extraction from the evergreen reserve forests in Kerala and Karnataka has now been halted) it must rank as a region of great conservation concern. The small remaining extent of natural forest, coupled with exceptional biological richness and ever increasing levels of threat (agriculture, reservoir flooding plantations, logging and over exploitation), are factors which necessitate major conservation inputs."

There are currently seven national parks in the Western Ghats with a total area of 2,073 sq. km (equivalent to 1.3% of the region) and 39 wildlife sanctuaries covering an area of about 13,862 sq. km (8.1%).

Hence further explanation with case studies will provide the details of the proposed study. It has been tried to meet the proposed objectives along with the case studies, which were conducted pertaining to the study area.

4.4 Case Studies: In the context of environmental information management for development of ecological concerns it was proposed to make two case studies. Case studies especially on the impacts of Environmental information management on the sensitive areas were conducted. Two such case studies were planned and conducted in the area of catchment of River Tunga.

These were conducted in the Tunga catchment area. One was exclusively on the movement by the activists and with the public participation. This case study was conducted as a major part of the impact due to information management as it was associated by public. The Delphi type of study was a quantitative approach in the same area on the perception and response of these activities. This study explores the overall measure of the entire movements of the environment at catchments of River Tunga.

An Overview of Environmental Movement in Karnataka

The present study was mainly aimed at understanding the environmental concerns developed with the aid of environmental information, its impact in sensitive zones and also to develop a suitable model of EIMS by studying the strengths and weakness of the available and possible environmental information systems. A qualitative approach in guiding the development of EIMS could be characterized by individual and/or group perception of matters of environmental concerns and environmental indicators. A quantitative ranking on the environmental concerns developed may be followed by overlapping the perception on the Knowledge discovery. The study includes involving the different individuals and groups/institutions. The study was conducted in understanding the environmental and ecological concerns

developed across the state. The information generated through the state on various aspects of the environmental issues have been considered. The geographical, historical and demographical concerns have been considered. The study have drawn the various attempts focused the issues related in Karnataka. The following are some the major environmental movements that were seriously concerned in the state. At the moment it is only considered to document the information about them. However the details of the issues are given later.

Internationally also the movements were taken place across the globe and as a result several environmental decisions had been taken place. These influenced the movements in various states. As has been discussed earlier on the convention on biological diversity for which countries were party to the international agenda on biodiversity. India signed the Convention on Biological Diversity on 5th June 1992, ratified it on 18th February 1994 and brought it into force on 19th May 1994. This convention will provide a framework for the sustainable management and conservation of India's natural resources

There are few movements that have taken place in different part of the state. Each was on saving their environment vis-à-vis their habitat. Some of them are known in the state that have created considerable attention of the public as well the administrators.

The following Table 7 has the details of few such movements, which have taken the attention of the public.

Table 7. Some of the Major Activities and the associated details

Activities	Particulars of Time, Place, etc		
Movements	Year	Place	Highlights
Sigadi Nillisi Parisara Ulisi (Against Prawn culture)	1994 May,28	Kumata	
Appiko Cahluvali	1978- 89-90	Uttara Kannada	Save trees
Aginest MRPL		Dakshina Kannada	Active
Sharavathi tale race Movement	70s 80s	Uttara Kannada	
Save western ghat March	70s &80s	West Ghat area	Good awareness
Kojentrics	1990s	Dakshina Kannada	Good success
Tunga Moola Ulisi (Save River Tunga)	1995	Shimoga	Active
Tunga & Bhadra Ulisi (Save River Tunga & Bhadra)	2001	Shimoga Bhadravati	Active
Against Kuduremukh Project	Since 1990s	Kuduremukh National park mining area	Active

Origin of Environment movements in Tunga river area.

I. Clay mine agitation in Tunga catchment area:

During 1995 few environmental workers objected the initiation of clay mine activity near Agumbe a place that receives highest rain in Karnataka. Being a place of very high rainfall clay mining activity would lead to lot of erosion and the eroded soil was reaching the tributary of river Tunga.

Activists and public objected based on the following.

- Activity has been on the bank of the river.
- The washed water would reach the river.
- Contaminated river may be changed in its optical property.
- The river is a major source of drinking further down streams
- It will also destruct the surface soil and vegetation (Plate 7 & 8 provides the details).

Plate 7. shows the surface disturbance due to a clay mine tried to initiate and Plate 8. shows that the Malathi river a tributary of Tunga carrying clay along the run off

Hence they were agitated and the following g actions were taken place.

- They hold a public march (Plate 9 & 10).
- They conducted a seminar and encouraged the public to participate in the discussions and awareness was created.
- They went to court against the company.



Plate 7. Surface disturbance due to clay mine tried to initiate



Plate 8. Malathi river a tributary of Tunga carrying clay along the run off



Plate 9. A scene from Save Agumbe agitation



Plate 10. Enthusiastic participants even during the rainy days

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Finally company withdrew the mining and stopped the activity

This had created sufficient awareness in Tunga catchment area and seeded the activities. The detailed discussions are further provided. That shows how various information sources from oral to print and dialogs have helped in this area for environmental protection.

Impact of environmental information response on Environmental movements in areas of River Tunga.

I. The case of Save river Tunga

River Tunga originates from western ghat area from a deep forested area. River Bhadra also originates from western ghat area, but both run different areas and meet at a place after traveling several kilometers and form the river Tungabhadra. People believe that the river Tunga is known for the drinking water quality, very sweet and tasteful. The entire catchment of the river is spread mainly in two districts namely Shimoga and Chikkamagalore. Particularly the talukas like Sringeri and Koppa in Chikkamagalore and Thirthahalli Shimoga district are very sensitive from the river point of view.

Perhaps the major concerns through the information sources on the sensitivity of the area has been started during late 1980s. A campaign to save Gubbagadde forest near Koppa was a start for public awareness point in Tunga catchment area. Though Kuduremukh Iron ore excavation started during 1969, its lease was coming to an end and the awareness company to shift its ~~area~~ was the initial point of activity.

The shift was forced to lease or sublease to another company by name Jayaprakash co. ltd. To initiate at Gangadikallu area a place of Tunga originates. To save the river from this unpleasant event Tunga Ullisi Horata Okkuta (Save Tunga River committee) came into existence. This team conducted over 100s of village meeting to bring public awareness about mining and its impact on environment. The following table 8 provides the details of different organizations that supported the movement. This forms the important information of interest of ecological concerns.

Table 8. Different organizations associated with environmental movements in Tunga catchment area.

People's Movement/ Local Organisations	19
Cultural Organisations	12
Professional Organisations	7
Political Organisations	6
Business/Commercial Organisations	17
TOTAL	61

Many public institutes including the local political parties supported the entire movement. The lists of such supporters are provided in Tables. In the leaflets prepared by the committee such details were provided. This has influenced the people and participation was ensured. The presentation details included the following.

Oral meeting

Personal discussions

Village meets & Jathas in village

The list of local Organizations supported the Save Tunga March are given below

Local organizations associated with environmental movements in Tunga catchment area.

-
1. Grama Sampanmoolasamrakshana Samithi
 2. Adhivasi Girijana Hitharakshana Samithi
 3. Karnataka Vimochana Ranga
 4. Karnataka Rajya Raitha Sangha
 5. Mahila Jagruthi
 6. Malenadu Jagrutha Samudhaya – Thirthahalli
 7. Pragathi para Vidyarthi Kendra
 8. Pragathi para Yojana Kendra
 9. Kannada Para Sanghatanegala ookutta
 10. Nellibeedu Hitharakshana Samithi
 11. Balekedarara Vedike
 12. Dalitha Sangarsha Samithi
 13. Souhardha Sanghatane
 14. Civil Liberties Forum
 15. Bahumatha Sanghatane
 16. Parisara Samrakshana Ookutta
 17. Arunodhaya Yuvaka Sangha
 18. Western Ghat Conservation Committee
 19. City Municipality
-

The following are the lists of cultural & professional organizations that supported the movement.

Cultural organizations associated with environmental movements in Tunga catchment area.

1. Holeranga Honnali
 2. Kannada Sahithya Parishath
 3. Durgigudi Kannada Yuvakara Sangha
 4. Karnataka Sangha
 5. Aasakthi Cultural Forum
 6. Ookaligaha's Women Forum
 7. Kadali Vanitha Samaja
 8. Bhoomika
 9. Srigangdha
 10. Sharadha Jaycees
 11. Friend's Centre
 12. City Club
-

Professional organizations associated with environmental movements in Tunga catchment area.

1. Kuvempu University Teacher's Association
 2. Bar Association
 3. Journal's Association
 4. District Freedom fighters Association
 5. Scheduled Caste & Scheduled Tribe Association
 6. District Backward class Association
 7. Postal Employees Association
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The first part of the paper is devoted to the study of the properties of the function $f(x)$ defined by the equation $f(x) = \int_0^x f(t) dt$. It is shown that $f(x)$ is a constant function. The second part of the paper is devoted to the study of the properties of the function $f(x)$ defined by the equation $f(x) = \int_0^x f(t) dt$. It is shown that $f(x)$ is a constant function.

The third part of the paper is devoted to the study of the properties of the function $f(x)$ defined by the equation $f(x) = \int_0^x f(t) dt$. It is shown that $f(x)$ is a constant function. The fourth part of the paper is devoted to the study of the properties of the function $f(x)$ defined by the equation $f(x) = \int_0^x f(t) dt$. It is shown that $f(x)$ is a constant function.

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Political organizations associated with environmental movements in Tunga catchment area.

1. Janatha Dhala (Secular)
- 2 City Congress (I)
3. Bharathiya Janatha Party
4. Communist Party of India
5. Communist Party of India (Marxists)
6. Indian Muslim League

Business/Commercial organizations associated with environmental movements in Tunga catchment area.

1. District Commercial Associations
2. District Bus owner's Association
3. Auto Owner's Association
4. Auto Driver's Association
5. District Lorry Owner's Association
6. District P.W.D. Contractor's Association
7. District Film Theater Owner's Association
8. Petrol bunk owner's Association
9. Grain merchants Association
10. Flower, Fruit & Vegetable merchants Association
11. Taxidriver's and owners Association
12. Jewellers Association
13. District Ricemill Owner's Association
14. District Hotel Owner's Association
15. District Liquor sellers Association
16. Laborer's Association & 17. Areca nut merchants Association

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes the need for transparency and accountability in financial reporting.

2. The second part of the document outlines the various methods and techniques used to collect and analyze data. It includes a detailed description of the experimental procedures and the statistical analysis performed.

3. The third part of the document presents the results of the study. It includes a series of tables and graphs that illustrate the findings of the research. The data shows a clear trend in the relationship between the variables studied.

4. The fourth part of the document discusses the implications of the findings. It highlights the potential applications of the research in various fields and the need for further investigation in this area.

5. The final part of the document provides a conclusion and a summary of the key points. It reiterates the importance of the research and the need for continued efforts in this field.

The previous details of the organizations shows that the impact of the information and network created due to the movement has made remarkable support by the public. These lists were taken by the activists and also the leaflets prepared by them.

Several campaigns were conducted by the activists. Table 9 has the details of such activities. Several thousands of pamphlets were made as source of information. The table provides the sources and kind of information, which has some results in management of environmental movement in River Tunga catchment.

Table 9. : Campaign details of Save Tunga River

1. No. of Villages contacted	Over 75
2. No. of site meetings conducted	Over 150
3. No. of people participated in each meeting	60 – 1000s
4. No. of pamphlets carried ecological concerns	Over 0.1 million
5. No. of posters brought the message	Over 25,000
6. No. of local posters and other materials	Over 50,000

(Source: Local News Reports between 1994-1995)

Some Specific observations on different cases of the active movements through information sources. The following were the important activities, which have taken place during the movement.

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1. A major seminar was conducted for which main national environmental personalities such as Mr. Sundarlal Bahuguna participated. Many state leaders, scientists and activists also participated. This was followed by a rally organized in the district head quarter Shimoga.

Plate 11. Shows Save River Tunga – A seminar participated by known environmentalists and Plate . 12. provides a scene of Save Tunga march in Shimoga

2. Message of environment was also carried through art processes. An Yakshagana a traditional dance drama with songs (an art form) was conducted. Plate 13. shows a scene from Yakshagana during the movement.

3. Messages were also carried through post card campaigns.

4. Some of the wall writings are commonly seen in the study area showing that they were also taken as sources to spread messages. Plate 14. showing such a scene in Kuduremukh Area.

Impact of the movement: It has been clearly shown that the public impact is tremendous. It had created considerable awareness and helped to save some of the habitats. One of the major impacts that had happened was that people have realized importance of their habitat and natural resources, which needs conservation and protection.

The annexure III, IV V VI & VII provides the details of certain activities happened during the movement and due to the movements.



Plate 11. Save River Tunga – A seminar Participated by Known Environmentalists



Plate 12. A scene of Save Tunga march in Shimoga



Plate 13. Yakshagana, A dance drama for spreading Message



Plate 14. Wall writing— As a means of communication

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Few other associated environmental features that are pertaining to river Tunga or due to Tunga movement have focused in the information sources and widely discussed in media. They have been discussed as impact and sources of information in creating environmental awareness. They were the following.

1.Kudremuch Iron Ore Co. Ltd. Mining Project:

Kudremukh has completed 20years of mining activities in the Kudremukh hills. It was a common scene of dumper movement in such a scenic place as highly disturbing motors. Plate 15 shows such a dumper moving with dust following the truck. It was reported in the Deccan Herald News of July 20th 2001 that by renewing the license, has gradually resulting in the drying up of the Tunga & Bhadra rivers. Several agitations and voices against the renewal of license were made. Exclusive association on saving the rivers Tunga and Bhadra has been formed as "Tunga Bhadra Ulisi Horata Okkoota", and that has been taken as forefront approach in reacting to ceratin environmental issues in this place.

A total bundh was observed on July 24th to protest against the extension of lease by the Government to the Kudremukh Iron Ore Company. Almost all political parties to the anti-mining campaign in the Kudremukh hills has cheered the "Tunga Bhadra Ulisi Horata Okkoota" which is heading the protest movement against the extension of mining lease to KIOCL.

To Okkoota leaders however it is the complete support extended by the common people. Activists of various organisations comprising the Okkoota have taken out several awareness marches throughout the villages and tribal



Plate 15. Dumper in Kuduremukh mining area

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settlements in the vicinity of the Kudremukh National Park demanding that the mining lease should not be extended as it would mean harm to the two rivers.

The KIOCL has completed 32 years of mining activity in the Kudremukh hills. President of the Okkoota, Kalkuli Vittal Hegde notes that while the good that the mining is expected to bring is hardly visible, the heavy silting and pollution of rivers stand as testimony to the harm that KIOCL has done. The pollution level in the Bhadra river is more than in the Tunga. Industries in the Steel Town Bhadravathi have also contributed their share of effluents to the river.

Opposition to such development schemes has seldom been so fierce. The burning question is whether the government will be persuaded by the environmentalists groups and the people. The Kudremukh National Park, nestled in the midst of the Western Ghats is identified as one of the 18 ecological hotspots of the globe, is supposed to be the third wettest region in the world with the annual rainfall exceeding 6000mm.

Three major rivers, Tunga, Bhadra and Netravathi also spring from the Kudremukh hills. The KIOCL which is situated in these very hills is extracting 10 million tonnes of iron ore annually. Repeated pleas by the green groups, pressure by the people and the anger of the local people has not deterred the government from going ahead with the denotification process.

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2. Sapping lifelines : Sapping

Any diversion of the Nethravathi waters will massively disturb the breeding cycles of millions of species of organisms in the Arabian Sea, says Ameen Ahmed to the Deccan Herald News.

After Kali, Sharavathi, Chakra and other river valleys of Western Ghats in Karnataka the target is on Nethravathi and Kumaradhara rivers which is considered home to some of the most spectacular rainforests in the entire Western Ghats.

Two projects have been planned to tame these wild flowing rivers. First one is a 18 MW Hydroelectric project at Doddahalla near Sakleshpur and the second is a ecologically and economically devastating project. That is diverting all the west flowing streams by building small dams and canals along the western face of the Western Ghats.

Reports contend the west flowing Netravathi river waters have been draining into the sea as a waste and should be diverted to the dry districts of Eastern Karnataka. By doing so the report claims that there would be no shortage of food and water for the population in these districts for generations to come. It is acknowledged that though the scheme is totally new it should be given the go in spite of criticisms, by comparing it to other big projects which have come up despite criticisms.

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3. A dam in distress due to catchment disturbance:

A report on the 'river of sighs' alerted the public through Deccan Herald. It was reported regarding the silting up of Tungabhadra dam which is down stream of this area. The river Tunga joins with Bhadra and run as Tungabhadra, hence the water source of this river is same as river Tunga. One third of the storage capacity of the Tungabhadra Dam is filled with silt, which has been deposited due to the delay in construction of check dams across the small feeding rivers.

Tungabhadra has been considered as the river of sighs. Unfortunately the storage capacity of this dam is decreasing steadily. Water fails to reach the parched lands of Bellary, Raichur and parts of Koppal districts due to the breach in the left bank canal or after the water level in the dam falls below the minimum level that is due to the silt deposited in the dam since its construction 50 years ago.

It is indeed a great loss as one third of the storage capacity of the Tungabhadra Dam is filled with silt, which has been due to the delay in the construction of check dams across the small feeding rivers.

Tungabhadra, a tributary of river Krishna is not only feeding the districts of central Karnataka, but also the border districts of neighboring Andhra Pradesh. The main purpose of the dam is to irrigate 14 lakh acres of parched lands of Karnataka and Andhra. Since both ends of the dam consist of iron ore rich spots and there are many iron and steel factories in the area the iron ore is regularly taken out by blasting the hills. The loose powder of the ore is

getting deposited in the dam. Hence the storage capacity of the dam is getting reduced.

Every year the canal end farmers resort to agitation for the dying crops but Tungabhadra Dam does not have enough water to meet their demands. During rainy season the dam gets filled and the excess water flows to Srisailem dam of Andhra Pradesh.

All this negligence is costing the farmers of the districts of Raichur, Bellary and parts of Koppal districts. Plans to stop the silt at various stages are not taking off and the project of parallel dam has not been approved. Unless immediate measures are initiated thousands of canal-end farmers will be badly hit.

4. The blasts in Tunga river area and after the process

Even as rehabilitation and compensation for those affected by the Upper Tunga Project is underway, the blasting near the site has unleashed fresh problems, reported in the Deccan Herald. At a time when any major irrigation project arouses strong reactions from environmentalist groups, the Upper Tunga Project is distinctive with very little controversy surrounding it. People have been complaining that the contractors who had taken up the blasting work had ignored all norms with regard to the use of explosives and conducted the blasting in such a way that it was causing damage to nearby houses.

The Upper Tunga project as per the initial proposal approved by the government of Karnataka in 1991 aimed at raising the height of the present

Tunga dam and to install radial crest gates. This project could regulate the water level at 1930 feet and there by irrigate 2,34,000 acres. According to the revised estimate the total cost of the project was approx. Rs. 877 crores. Due to the technical and economical problems it was decided that a new dam would be built at a distance of 100 meters from the existing dam.

The project would irrigate about 2,34,000 acres, with the major beneficiary being Rannebennur taluk where around 1,07,200 acres will be irrigated. Like any other major irrigation project, the UTP is also saddled with the problem of submersion of villages and forestland. The other main controversy surrounding the UTP has been the canal works. The lack of planning and foresight is evident if one sees the path of the canal, which moves through several residential extensions of the city.

Conclusions: River Tunga is known for the source of drinking water. People right from the origin of the river till it ends at joining the Bhadra, it has been a major source of drinking water. Tunga Panam a phrase known in the area that means is good for drinking water. Hence the people want it to be conserved forever. The study area and its environmental information generated and disseminated have drawn the attention of public. This has created a proper attention and awareness among the public. The perception and feeling of the people of the study area shows that the informed people were due to the sources that were aimed for the purpose.

Case Study II

Western ghat biodiversity network (WGBN) and its information concerns on environmental conservation.

The present study was taken up to understand the processes of the academic and research perspectives on ecological concerns. The study area has been under the Western ghat area, and shown the concerns related to the western ghat hence the present case study was initiated. The network was an excellent coordinated effort of the different institutions and scientists with student participation. Several colleges, the list is provided later, - had participated in the biodiversity documentation and developing the information there by relating the concerns. The following details have been obtained in the process of understanding and during the study period. This was conducted by visiting the sites as well meeting the resource persons of the network.

The details are given in different sub-headings as follows.

1. Background of the network study

Complex natural systems such as soils, groundwater, and populations of disease vectors like mosquitoes exhibit a great deal of variation in space and time. Documenting such variation is essential for good management of environmental resources; it can also provide for students and teachers excellent opportunities for first hand scientific observations. This report describes such an experiment, focusing on inventorying and monitoring of biodiversity of the Western Ghats. Initiated in early 1994, this experiment involves a network of over 20 undergraduate colleges collaborating with ecologists at the Indian

Institute of Science in Bangalore. Experience gained so far in this programme suggests that such field research could serve as a valuable teaching device, as well generate useful inputs for decentralized management of natural resources at the panchayat and district levels.

Complexity and diversity are the new frontiers of science. The focus is now on systems like climate, and on the extent to which it will change as a consequence of an increase in the concentrations of greenhouse gases. It is on the diversity of life, and on the rate at which this is being eroded through manifold human impacts. It is a contagious disease like AIDS and understanding how they spread as a result of human social behavior. The most significant challenges before science today lie in understanding complex systems with a great diversity of behaviors in space and time.

This shift in focus to complex, diverse systems has important implications for a country like India. Biologists have identified India as one of the top twelve mega diversity countries of the world; harboring an estimated 500,000 out of some 10 to 30 million species of living organisms. Indian monsoon circulation is amongst the most variable in the world, and is suspected to drive the El Nino - La Nina oscillations. India harbors amongst the culturally most diverse societies in the world, with shifting cultivators and artisanal fisherfolk coexisting with shrimp aquaculturists and software engineers (Gadgil and Guha 1995). So India offers a wealth of fascinating, complex, diverse systems for our scientists to work on. There are interesting new facts to be discovered about these systems and we are placed in an advantageous position to do so.

This is not the case when dealing with relatively simpler physical, chemical systems. Such systems are more universally accessible for investigations. In consequence, relatively readily accessible facts tend to be already known, and discovering new facts calls for elaborate, expensive experimental set ups, highly purified, expensive chemicals. As citizens of a relatively resource poor country Indian scientists are at a disadvantage in working with such simpler systems. But India with its large numbers of trained men and women could be at a considerable advantage and make significant contributions worthy of it, if our scientific community purposefully addresses the challenge of working at the new frontiers of science; of complex, diverse systems.

2. W G B N Project Approach

1. Identifying a compact landscape of 5-50 sq.km. for investigations obtaining background maps and statistics.
2. Contacting local people, identifying especially knowledgeable individuals such as dispensers of herbal medicines, fisherfolk, minor forest produce collectors; also contacting local school teachers and leaders and inviting their participation.
3. Mapping the landscape in terms of constituent habitats, ascertaining local ecological history of ongoing habitat transformation and causes of these transformations.

4. Investigating a representative sample of the various habitat types of the landscape in terms of levels of biodiversity of selected taxa such as medicinal plants, wild relatives of cultivated plants, lichens, earthworms, fish and birds.
5. Documenting local knowledge, uses, conservation practices and understanding of threats to the selected elements of biodiversity.
6. Providing such documentation as a community registers of local biodiversity, its uses and conservation practices in the local language.
7. Assessing implications of ongoing habitat transformations for levels of biodiversity.
8. Translating this information into suggestions as to concrete conservation measures and biodiversity friendly interventions.

3. Western Ghat Biodiversity Network's Study Sites in Karnataka

1		
Institution	:	MESMM Arts & Sc. College
Head Quarters	:	Sirsi
Study-site	:	Manakani
Domain	:	Neggu Panchayath
Area in Square kilometers	:	20
Orientation	:	South
Distance from the head quarters:		14 KM
Latitude	:	14d33'
Longitude	:	74d39'
Average Annual rainfall	:	2500
No. of dry months	:	6

2.

Institution	:	A. V. Baliga College
Head Quarters	:	Kumta
Study-site	:	Badal
Domain	:	Santeguli P
Area in Square kilometers		50
Orientation	:	E
Distance from the head quarters:		25
Latitude	:	74d30' to 74d45'
Longitude	:	14d15' to 14d30'
Average Annual rainfall		3500
No. of dry months	:	6

3

Institution	:	Visvesvarayya College
Head Quarters	:	Bhadravati
Study-site:		Neralekoppa
Domain	:	N. R. Pura
Area in Square kilometers:		25
Orientation	:	N
Distance from the head quarters:		56
Latitude	:	13d35'
Longitude	:	75d15'
Average Annual rainfall:		3000
No. of dry months	:	5.5

4

Institution	:	JCBM College
Head Quarters	:	Sringeri
Study-site	:	Merkal
Domain	:	Sringeri T
Area in Square kilometers:		25
Orientation	:	W
Distance from the head quarters:		10
Latitude	:	13d24'to 13d27' N
Longitude	:	75d09' to 75d12' E
Average Annual rainfall:		4000
No. of dry months	:	5.5

5

Institution	:	Poornaprajna College
Head Quarters	:	Udupi
Study-site	:	Kucchur
Domain	:	Karkala T
Area in Square kilometers:		40
Orientation	:	E
Distance from the head quarters:		36
Latitude	:	13.4d N
Longitude	:	75d E
Average Annual rainfall	:	4000
No. of dry months	:	5.5

6

Institution	:	M.G.M. College
Head Quarters	:	Udupi
Study-site	:	Perdoor
Domain	:	Udupi T
Area in Square kilometers:		45
Orientation	:	SE
Distance from the head quarters:		21
Latitude	:	13d20'
Longitude	:	75d
Average Annual rainfall	:	3000
No. of dry months	:	5.5

7

Institution	:	Bhuvanendra College
Head Quarters	:	Karkala
Study-site	:	Mala
Domain	:	Karkala T
Area in Square kilometers:		46
Orientation	:	E
Distance from the head quarters:		18
Latitude	:	13d02'
Longitude	:	75d15'
Average Annual rainfall	:	4000
No. of dry months	:	5.5

8

Institution	:	Nehru Memorial College
Head Quarters	:	Sullia
Study-site	:	Subramanya
Domain	:	Sullia T
Area in Square kilometers	:	25
Orientation	:	NE
Distance from the head quarters:		36
Latitude	:	12.71d to 12.77d N
Longitude	:	75.58d to 75.68d E
Average Annual rainfall	:	4000
No. of dry months	:	5

9

Institution	:	VGKK NGO
Head Quarters	:	B. R. Hills
Study-site	:	Punjur & Bedaguli
Domain	:	Chamarajanagar T
Area in Square kilometers:		400
Orientation	:	S
Distance from the head quarters:		40
Latitude	:	11d40' to 12d09' N
Longitude	:	77d05' to 77d15' E
Average Annual rainfall	:	1000
No. of dry months	:	6

10

Head Quarters	:	Bhadravathi
Study-site	:	Gandhigram
Domain	:	Gandhigram
Area in Square kilometers:		25

10 Sites of the above were involved in the network project in generation of the biodiversity information.

4. Western Ghats Biodiversity Network Expertise Included

SUBJECT specialization such as

- Amphibia,
- Angiosperms,
- Aquatic Botany,
- Aquatic Zoology
- Aquatic insects
- Birds,
- Bryophytes,
- Liverworts,
- Mollusca
and
- Pteridophytes

Under these specialization several taxa were investigated The following Table 10 provides the list of taxa included under the investigation. The two sites Bhadravati and Sringeri were in the actual study area.

Table 10. Taxa under investigation

HQ	TREE	NONTREE	FISH	AMPHIBA	REPTILE	BIRD	BUTTERFLY	MOLUSC	ANT
Sirsi	+	+	-	-	-	+	+	-	-
Kumta	+	+	+	-	-	+	+	-	+
Bhadravati	+	+	-	-	-	+	+	-	-
Sringeri	+	+	+	+	+	+	+	-	+
Udupi-K	+	+	-	-	-	+	+	+	-
Udupi-P	+	+	-	-	-	+	+	-	-
Karkala	+	+	-	-	-	+	+	-	-
Sullia	+	+	-	-	-	+	+	-	-
B. R. Hill	+	+	-	-	-	+	+	-	-

5. Documenting Diversity :

An Experiment and discussions of biodiversity network, as the source and method of researching the ecological information. This has been discussed in the following headings.

Science as a process

Down to earth

Biodiversity

International Convention

Immense task

Western Ghats

Research Methodology

Network Profile

Landscape ecology

Sampling Diversity

Practical ecological knowledge

Capacity Building

Strengths and weaknesses

International Programmes

Prospects

5.1 Science as a process

Admittedly, we are far geared to take on this challenge. One of our main shortcomings is the system of science education. Any worthwhile system of science education would teach science as a process; a process of discovering new facts, organizing them in appropriate systems, making new predictions on the basis of such understanding and going out to look further for yet more new facts in the light of these predictions. But our current system of science education tends to treat science as a collection of facts, to be memorized by rote and reproduced at the time of examinations. This is in part inevitable in teaching about simpler systems of physics and chemistry, for in these contexts

new facts are so hard to come. Given the difficulties of properly equipping the laboratories in our teaching institutions, students have very limited opportunities of familiarizing themselves at first hand with even the known basic facts, let alone explore new facts. So science education ends up as an exercise of learning facts by heart from books, with little contact with the real world. This is not a system conducive to producing scientists equipped to explore new frontiers.

In the study of complex, diverse systems, in contrast, new facts are all around us and these are facts both of scientific interest and of practical value. The West Coast of India receives as much as 3000 mm of rain in many places. Yet many coastal villages and towns experience acute scarcity of drinking water in the summer. Moreover, such places find brackish sea water encroaching on the ground water aquifers supplying their drinking water wells. It is important to understand the water cycle in these tracts, the relationship between surface run-off and percolation to the ground water aquifer, the role vegetation, soils and rock structure play in this context, the interplay between the freshwater aquifer and the sea water (Gadgil 1990).

The pertinent facts change from locality to locality, from season to season, from year to year. So they need to be continually monitored everywhere, interpreted in the proper theoretical framework and used to predict when and where water scarcities will develop. To take another example, India's west coast abounds in a diversity of medicinal herbs as well as a diversity of medicinal uses of these herbs by the various tribal, rural communities and in systems such as Ayurveda, Siddha and Yunani. Populations of many of these herbs are being decimated today through over harvests by

agents of pharmaceutical companies, and through destruction of their habitats in many different ways. It is important to document the various reported uses of these herbs, to assess their efficacy, to monitor the status of their populations. These facts also vary from locality to locality, from year to year. They have important practical applications in terms of commercial production of pharmaceuticals, of providing readily accessible health care to large numbers of our people, of maintaining long-term viability of the populations of these species.

5.2 . Down To Earth

These are just two of the many, many examples of how the study of behavior of water, rocks, soils, microbes, plants, animals, human groups would generate new facts of scientific interest, and with practical implications. Surely involving science students, and of course, teachers as well, in a process of discovering, interpreting and predicting on the basis of such new facts observed first hand, would be the best way of training practicing scientists for India. The difficulty of course is that such a system of training scientists cannot be organised in a routine, unimaginative, centralized fashion. Moreover, the training students receive through such a process, cannot be assessed through routine, unimaginative, centralized examinations. It would therefore call for more initiative, more effort on the part of teachers and administrators. It would also mean much less scope for private coaching in which many teachers are involved today. So there would undoubtedly be some inertia and some vested interests against implementing such proposals. But the students, unless they get away with copying at the exams, would stand to gain in every way. For now their effort would go into making first hand scientific observations, interpreting

new data in place of learning dead, seemingly irrelevant facts by heart. The process would not only help produce a scientific manpower and womanpower that can work far more competently on real life problems, but the process would generate information that would be of use in tackling real life problems of relevance to the society.

5.3 Biodiversity

The fact that such a process can generate information of social relevance means that the society would be more readily willing to fund this type of science education. I would like to discuss here a concrete example of how such funds can be available, and can be put to use to generate activities of both educational and practical value for science teachers and students. The activities pertain to inventorying and understanding on-going changes in the levels of biodiversity of living organisms. Such an understanding of levels, distribution and dynamics of biodiversity has assumed considerable significance over the last decade for two reasons. Firstly, recent developments in molecular biology now make it possible for us to move genes across completely unrelated organisms - from mammals to yeasts, from bacteria to insects. This has added an entirely new dimension to the possibilities of putting genetic resources to human use, so that organisms once thought of as totally insignificant may now be put to use and result in large commercial gains. Along with this have come the possibilities of patenting of living organisms and their products. Thus Japanese have applied for a patent on the digestive enzymes of an Australian frog that broods its young in its stomach. Perhaps these enzymes hold clues to the treatment of stomach ulcers. Japanese also reportedly import from the west coast of India insectivorous plants belonging to the genus *Drosera* ; they may

be developing some applications based on their unusual enzymes. Along with such technological developments and opening up of commercial possibilities has come the realization that the world's heritage of biological diversity is being rapidly eroded and requires urgent action for conservation.

5.4. International Convention

These two-fold developments, a realization of tremendous value and a concern with long-term conservation, have recently resulted in an International Convention on Biological Diversity (CBD) initiated at the Rio Earth Summit in June 1992 and in force since December 1993 (UNEP 1992). CBD, for the first time recognizes the sovereign rights of all countries over their biodiversity resources, commits all parties to the convention to facilitate access to their resources, and in return promises the countries of origin of such resources favorable treatment in terms of transfer of technology and of financial resources. CBD commits countries to prepare proper inventories of their biodiversity resources, to monitor their fate, to organize adequate information systems for such resources, and to take steps to conserve them. CBD also recognizes the role of indigenous communities in conservation and sustainable use of biodiversity resources and enjoins member countries to share benefits of utilization of biodiversity resources with these indigenous communities.

India, along with 125 other countries is a party to CBD and therefore committed to developing an inventory of its biodiversity resources, monitoring their dynamics, organizing a computer-based system of such information and working out an effective strategy of conserving these resources (Gadgil 1994). It is also committed to documenting the knowledge and practices of

conservation and sustainable use of biodiversity elements by its indigenous communities. These are major challenges before India's biological, informatics and anthropological communities, challenges that can be turned into significant opportunity for injecting a new vigor into our educational and research establishments, and to contribute towards conservation of our national heritage. There is genuine social demand at the national as well as international level for addressing this challenge, and financial resources are being mobilized. What is needed is the will to organise the effort.

The task of inventorying and conserving biodiversity is immense, for valuable elements of biodiversity are not restricted to a few pockets, in a few national parks. Wild relatives of rice for instance occur in numerous wetlands dispersed over the Indian countryside and wild relatives of taros and yams are to be found along road verges. The insectivorous *Drosera* plants being quietly collected and exported to Japan occur in small rain puddles on sheet rocks all along the Western Ghats. So the task must truly cover all of the country, and concern itself as much with lowly lichens and leeches, mushrooms and mayflies as with tigers and rhinoceros.

Such a task cannot be carried out in a routine, centralized fashion for the ecological systems are highly variable in space and time, and must be investigated and more importantly managed in ways sensitive to this variation. So it is necessary to organize an effective network covering the entire country. Such a network will have to be erected on two pillars; the large numbers of students and trained biologists working as teachers in undergraduate colleges throughout the country and the even larger number of practical ecologists - fisherfolk and shepherds, dispensers of herbal medicine and rat catchers who

depend on living resources for their livelihoods (Gadgil 1994). If mobilized such a group will not only generate valuable information, of both basic and applied interest but the process will also serve as an excellent tool of training in science.

5.5 Support for the network study

In 1993 funds for such an experiment became available to the network through an award as a Pew Foundation Fellow in Environment and Conservation. The foundation provides to the fellow's institution an amount of \$150,000 to be spent over a four-year period in a flexible fashion at the fellow's discretion. This support has been used to organise a network of undergraduate colleges, university departments, and NGO's to investigate the biodiversity of the Western Ghats. The hill chain of Western Ghats, has been recognized as one of the World's 18 Biodiversity Hot Spots, i.e. a region of high levels of biodiversity under threat of rapid loss. The Western Ghats are an island of tropical humid forest at a considerable distance from the large humid forest tracts of Southeast Asia, and harbor a large number of endemic species i.e. species occurring nowhere else in the world. Inventorying, monitoring and conserving the biodiversity of the Western Ghats is therefore an important concern.

Along with the adjoining West Coast, the Western Ghats are a region of highest levels of literacy on the Indian subcontinent. It therefore has a large number of biology teachers, certainly well over 1000, many of them Ph.D. holders working in undergraduate colleges. have been in touch with several of them over the years, having organised a successful project to evaluate the

impact of the Western Ghats Development Programme with the help of students and teachers of 28 colleges in Karnataka in 1990-91. So when the Pew Award funds became available network leader invited 45 Biology teachers from the Western Ghats states of Maharashtra, Goa, Karnataka, Tamilnadu and Kerala to consider the possibility of working together on biodiversity problems of the region. We met in Bangalore from April, 4 - 7, 1994 and agreed to collaborate. A series of intensive workshops, including several on field methodology followed. This has resulted in the establishment of the Western Ghats Biodiversity Network (WGBN) functioning in a co-ordinated fashion with a common methodology jointly evolved by the whole group.

The network initiator was Prof Madhav Gadgil of Centre for ecological sciences Indian Institute of Sciences, Bangalore

5.6 Research methodology

The research methodology followed in the network documentation involved the following elements :

1. Each team selects an area of about 25 sq.km, preferably close to the location of their institution, for biodiversity studies. These study sites include examples of both relatively natural, as also human-impacted ecosystems.

2. These study sites are investigated as a landscape composed of different individual elements such as evergreen forest, moist deciduous forest, tree savanna, grasslands, ponds, seasonal streams/streamlets, habitation etc.

Initially different types of landscape elements are identified and mapped with the help of a Survey of India toposheet.

3. This landscape map is compared with a false colour composite of a satellite imagery and correspondence is established between ground truth and imagery. Certain ground control points which can be reliably located on the topographic map and on the satellite image are identified, and ground truth ascertained in the vicinity of such points. The control points are used to correct the geometric distortion in the satellite imagery. All this information leads to generation of supervised classification of the landscape under investigation.

4. The landscape map serves to locate representative elements of each type of landscape element for an investigation of levels of species diversity in selected groups of organisms such as freshwater molluscs and insects, mosses, flowering plants, butterflies, ants, legless amphibians and birds.

5. These landscape maps are compared with information obtained on earlier status of the landscape from older topographic maps, satellite imagery, as also oral accounts of the local people to reconstruct the ecological history of the landscape.

6. Local people are interviewed to document their knowledge of occurrence and uses of various plant and animal species as also of local conservation practices. Also documented is their perception of ongoing patterns of landscape change, ongoing changes in biological communities as well as species of particular interest such as medicinal herbs, and their perception of forces driving these changes.

7. All of this information is put together to derive a picture of ongoing changes in biodiversity, forces driving such changes and of how local communities perceive these. Attempts are being made to use these as inputs for the development planning process at the panchayat, taluk and district level to steer development on to a more environment friendly course.

5.7 Network Profile :

The programme was kicked off with a 4-day methodology workshop held in field at the Integrated Rural Technology Centre of a Kerala Sastra Sahitya Parishat at Mundur near Palakkad from May 28 - 31, 1994. It brought together 35 science teachers representing 27 institutions with researchers from the Indian Institute of Science (IISc), M.S. Swaminathan Foundation (MSSF) and the Foundation for Revitalization of Local Health Traditions (FRLHT). These 27 Institutions included 2 University botany departments, 20 undergraduate science colleges and 5 NGO's. Two of these NGOs were in fact channelising funds to 2 more colleges. As Fig 8 shows the network spans the entire north-south stretch of the Western Ghats in the states of Maharashtra, Goa, Karnataka, Kerala and Tamilnadu. It covers the elevational gradient from sea level to 1200m; the greatest concentration being in the range of 0 to 600m. The sites under investigation thus do not include higher altitudes above 1200m. Indian Institute of Science, however, has a field station in the upper Nilgiris at an altitude of 2000m, helping to fill this gap. The sites cover the rainfall gradient from 1000 to 6000mm a year, as also over 3 to 8 dry months a year. The vegetation types investigated by the network span wet evergreen forests and various cultivations through moist and dry deciduous forest and scrub,

leaving out only the high altitude sholas and grasslands; these are being studied through IISc's field station.

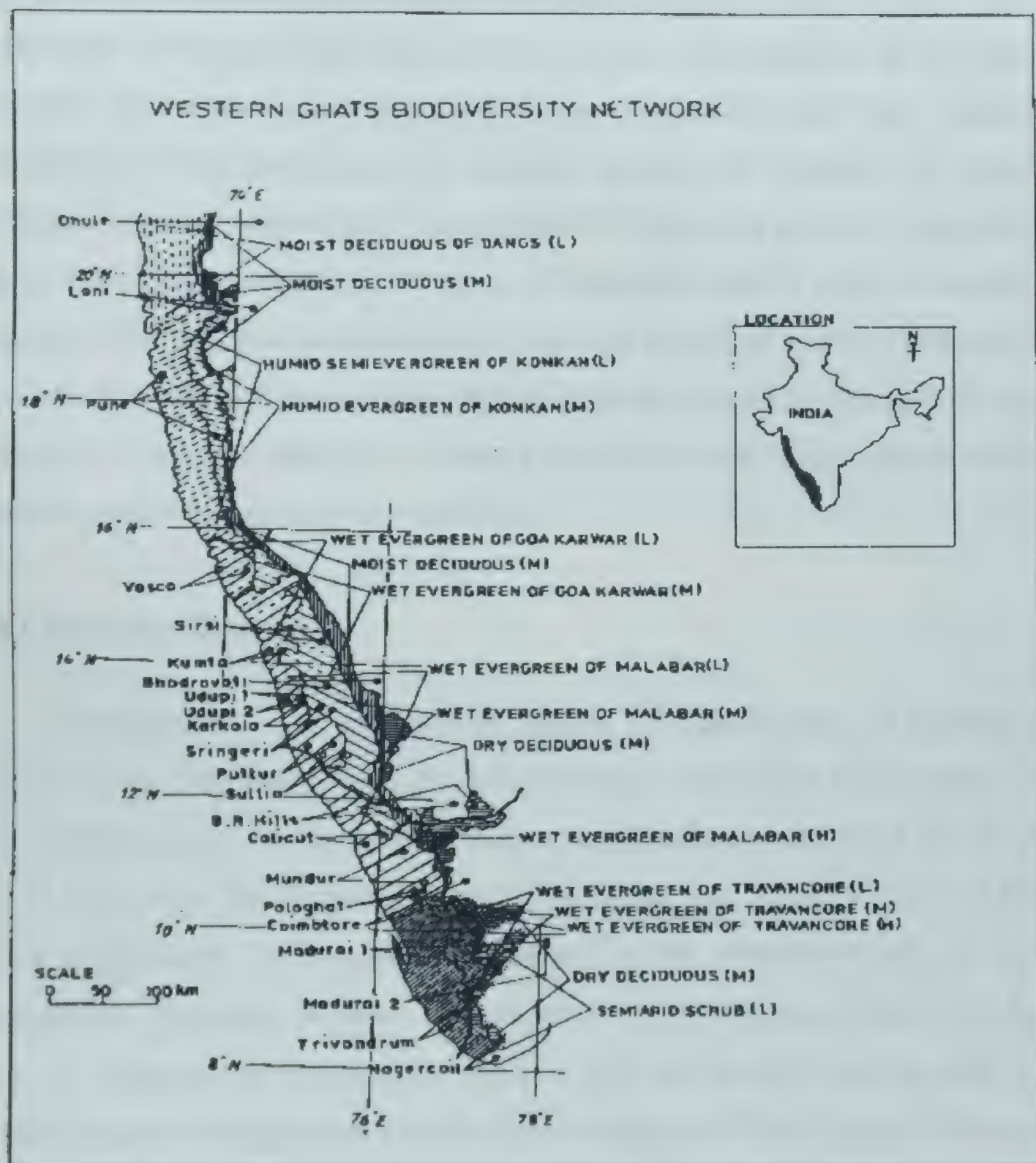


Figure 8 : Study sites of the Western Ghats Biodiversity Network.

(Note for the Fig 8: Network members in relation to the distribution of vegetation types. Open circles refer to the headquarters of the member institution, filled circles to the study sites. The letters L, M and H in brackets following the vegetation type refer to low (0 - 600 m), medium (600 - 1200 m) and high (above 2000 m) elevation zones)

The actual study sites range from a distance of 10 to 200 km from the location of the institution involved; the median distance being 40 km. Most study sites are considerably impacted by human interventions; all of them however do retain some tracts of forest vegetation with near natural composition. The landscapes are intricate mosaics of patches and linear elements. For our purpose only those above 2500 sq. m in size are recognized. These have been assigned to 45 types of terrestrial and 10 types of aquatic elements. The study sites are mosaics of several individual patches, belonging to 4 to 20 types. Of these scrub, disturbed moist deciduous forest and tree savanna are most widespread, occurring in 60% of the study sites; 5 other element types occur in only one site each.

5.8 Landscape Ecology

Development of a standardized system of classification of landscape element types, their mapping in the field, leading to supervised classification of the satellite imagery on the basis of such a map has been completed for 20 of the 27 study sites. The Regional Remote Sensing Service Centre (RRSSC) of the Space Department in Bangalore has played a key supportive role in this programme. Attributes of these landscapes are now being analysed with the help of Geographical Information System, and we should soon be able to publish a rather comprehensive study of the landscape of the Western Ghats as a result of the co-operative effort of WGBN in collaboration with the RRSSC, Bangalore. The system of classification of landscape element types for this biogeographic province could be the starting point of developing a comprehensive system of this type for other parts of India as well.

5.9 Sampling Bio-Diversity

Mapping of the landscape provides the context for field sampling of diversity in a variety of taxonomic groups. The attempt is to sample patches of all types of landscape elements with greater emphasis on types such as evergreen forest supporting higher levels of diversity. This sampling involves laying of quadrats of 10m x 10m at 40m interval along transects 600m long, if necessary in more than one segment in smaller patches. Birds and butterflies are sampled along the entire 600m transect, while trees and other taxa such as ants and frogs are sampled in the quadrats. Freshwater molluscs and insects are being sampled in aquatic habitats through as yet unstandardized methodologies. Caecilians (legless amphibians) are also being sampled opportunistically in their preferred habitats, apart from quadrats.

Such sampling has progressed to varying degrees. A total of 250 transects have been laid over 25 study localities; sampling of trees has been concluded in 3000 quadrats of 100 sq m each over these transects. Birds have been sampled along 75 transects in 15 study localities; butterflies along 90 transects in 15 localities. Some limited sampling of freshwater molluscs, fishes, mosses, freshwater insects, ants, caecilians frogs and snakes has also been completed. Much of these data have been computerised using a common format; and was analysed.

5.10 Practical Ecological Knowledge

WGBN has, from its inception, attempted to interact with and involve local communities in the exercise. An important component of the programme is to document the perceptions and knowledge of the local communities

regarding the landscape over which they gather resources such as fuelwood and medicinal herbs, the status and ongoing changes in the soil, water and biological resources. This programme of community level documentation is being undertaken as a part of the larger countrywide exercise of "Community Registers" initiated by FRLHT. Based on the field experience gained over the first year, a 4-day field methodology workshop on community register was held at Phansad Wildlife Sanctuary in Raigad district of Maharashtra in August 1995 under the leadership of Prof. K.C. Malhotra and Prof. M.K. Prasad. Following this workshop systematic case studies of 4 localities have been initiated. At a more general level such documentation continues in all localities. The use of plant poisons to collect fishes and protection to sacred Ficus trees is being comprehensively documented in many of the localities.

This exercise of community register includes an important component of local knowledge of changes taking place in the landscape and forces driving these changes. These changes are related to changes in levels of biological diversity deriving from habitat changes, as well as changes due to direct exploitation of biological resources. Local people are then encouraged to propose how they would like to see the processes of landscape transformation and of changes in biodiversity regulated. It is hoped to use these proposals as inputs to the decentralised processes of management of natural resources at the Panchayat and district levels. It is also hoped that the documentation of the knowledge of uses of elements of biological diversity by local communities could aid in their sharing in the benefits of commercial uses of this diversity within the framework of the Convention of Biological Diversity.

5.11 Capacity Building in Network Project

WGBN has elicited enthusiastic participation by a number of undergraduate science teachers and students. The field work is spearheaded in some cases by committed teachers, in some other cases students are the driving force. A total of 300 students were reported to have participated in the field work; of these 206 students have been active throughout. Five of the students involved have taken up special projects on their own, on bird and butterfly communities, attributes of tree bark and local knowledge. A total of 33 teachers belonging to Zoology (19), Botany (10), Statistics (2), Computer Science and Economics (1 each) have participated; of these 20 have been particularly active. Seven of these active teacher participants were invited by the Museum of Natural History in London to work at their collections over a six-week period in June-July 1995. They were accompanied by one scientist each from the Botanical and Zoological Surveys of India. We are thus in the process of establishing active collaboration with the Surveys to help in identification and build systematic-biological capabilities at the colleges.

5.12 Strengths and Weaknesses

Experience of the network over the last 18 months has helped us understand both strengths and weaknesses of the institutions involved. University post-graduate departments are very much dependent on Ph.D. student research and cannot readily involve in a co-operative programme of this type. NGO's, especially those dependent on one or few active individuals are also at a disadvantage. Under-graduate science colleges, can, however

function very effectively in such a programme. There are of course certain limitations. Currently all such activity has to be on a voluntary basis, since no academic credit is available for such field research. Therefore teachers and students can spend a limited amount of time in the field, and this has to be fitted in with the annual calendar so as not to interfere with the examinations. Given these limitations, their performance has been very encouraging. 200 students and 20 teachers have put in about 4000 total person days of field research over the first year i.e. 18 field days per head per annum. As the methodology gets well established, they may be able to do better, and may expect each individual teacher and student to put in 30 days of field work per academic year. Given that there are over 6000 undergraduate science colleges in India, this could amount to a substantial contribution.

The programme started off with 20 colleges 5 NGO's and 2 University Departments. Of these 3 colleges, 1 NGO and both the University Departments have withdrawn after completing some limited amount of work. But 17 colleges and 4 NGOs have done well and are keen on long term continuation of such a programme. We had initiated the network by contacting 45 institutions, of these 27 could be invited to actively participate because of limitation of funds. Of the 27, 21 continue, and at least 12 have performed extremely well. It is believed that is to be a very encouraging success rate.

5.13 Under the International Programmes

India, along with 125 other countries is a party to the Convention on Biological Diversity and therefore committed to inventorying and monitoring levels of biological diversity, record this information in computerised data bases

and use it to develop strategies of conserving biodiversity. India has also agreed, as a member of the Commission for Sustainable Development, to implement decentralized programmes of integrated environmental assessment as a part of Agenda 21. Programmes being undertaken by WGBN could be a useful model for organising such activities within the country, and perhaps elsewhere in the world as well. These programmes also deal with several elements of a major international scientific effort, Diversities, being co-ordinated through UNESCO, ICSU and IUBS. It is hoped that WGBN would develop in the years to come mutually beneficial links with such international efforts.

5.14 Prospects of the Project

A great deal could and should be done to take this experiment further. We need to create in our educational system much greater flexibility to encourage original research by teachers and students, especially at the undergraduate level. Such work should be rewarded by academic credit. As argued above, field work on soil, water, biological resources could form a most valuable component of such research. Such field work needs to be promoted by greater flexibility of teaching schedule.

Institutions of higher learning and scientific agencies such as Botanical and Zoological Surveys of India need to be encouraged to actively work with undergraduate colleges in such programmes, perhaps through award of special grants. At the same time, we need to create mechanisms for using the results of such research as inputs for a decentralized process of development planning at the Panchayat and District Levels.

Programmes such as District Level Units of National Natural Resource Management System of the Department of Science and Technology and Paryavaran Vahinis of Ministry of Environment and Forests could fruitfully collaborate with such efforts.

While much remains to be done, there are many hopeful signs of progress in these directions, with a much greater interest in nature study amongst the younger students and a strengthening of the Panchayat Raj Institutions. We must now make serious efforts to explore these spaces, and to infuse genuine vigour in our scientific investigations, as well as efforts at taking good care of our natural heritage.

Salient Achievements of case studies

Linkages developed : As an action research the study has developed a good net work of activists, environmental concern people, teachers, and local people of sensitive area of the case study proposed. The people of the study interest are representing the different class of the society in the state. The study has helped to explore the possible fields of environmental interest such as the following

1. Biodiversity: Flora & Fauna, Domesticated diversity and Farming diversity etc.
2. Conservation potential : Native resources and sustainable strengths
3. Knowledge Discovery : Awareness building, Adaptable practices and environmental strengths of conservation strategies.

4.3 Environmental information management systems for ecologically sensitive area.

1. Towards Developing the Environmental information management systems for ecologically sensitive area.

Both natural processes and human management have generated and sustained a vast array of environmental and ecological diversity. Within sensitive systems this sensitivity performs many closely interrelated socio-economic and environmental functions, including promoting food and livelihood security; maintaining productive and environmental sustainability; and contributing to resilient development.

But this environmental information management system here after referred, as EIMS is being needed may not be a sole tool but as a supportive tool embedded in the developing strategies. *Environmental information management system is the management of database with regards to a given habitat used directly or indirectly for conserving the environment and ecological interest. The diversity of interests includes the natural resources, biodiversity and those in the wider environment that support the given ecological systems.*

High ecological sensitivity may have many different production functions, that are evolved by complex systems such as soil, water, Air, vegetation, Animals, Birds, Agricultural systems, etc. Ecosystem may manage primarily to save the entire habitat, the soil and water in intensive systems.

However, the overall interests chosen will usually perform other functions in the ecosystem such as enhancing biodiversity, improving soil and water quality, vegetation as well as playing a role in the entire ecosystem management by providing habitat heterogeneity and preserving a favorable balance between natural and induced functions

In the context of agricultural ecosystem Agricultural Biodiversity also influences landscape structure by providing environmental services and functions and human activity can transform whole landscapes over large areas. For example, many rural communities enrich their agricultural plots and forests, fallows with valued perennial plants. Through such enrichment practices, successional vegetation can become a site for economic production as well as for ecological rehabilitation.

The knowledge potential of rural people to manage and enhance ecosystem is substantial. These systems became tuned to local needs over centuries and detailed knowledge allowed people to social and ecological change. However, many modernising interventions and colonial administrations have ignored the importance of local knowledge and skills, resulting in an erosion of knowledge and an undermining of formal and informal institutions that were central for the sustainable management of agricultural biodiversity. These institutions include rules about use of biological resources and distribution of benefits, tenure, conflict resolution mechanisms and methods of enforcing rules, cultural sanctions and beliefs.

In the present context in Karnataka, which has housed a variety of ecosystems, virtually covering all major tropical types opts a definite plan of action towards the conservation of these traditions and rich heritage of

ecological diversity. *The water soil, crop diversity, vegetation, fishes, birds, other animals*, etc., have been nurtured and respected over centuries. This was due to our people's conservation interest and the support of ecosystem strength.

2. Why EIMS? Vis-a-vis Role Environmental Information role in the ecosystem conservation

Conservation has always drawn the attention and interest of variety of publics, institutions with, set objectives. Considering the contributions of ecological diversity were realized over the years of understanding and have led to conservation interest and drawing the attention of people and institution and their by policies.

Important production functions of such Databases

Serving as the source of information.

Provides the dynamics of changes in proper updating.

Helps in decision making

Guide to take up developmental activities ecologically

Acts as a conservation tool

Helps to be an informed society

And

Ensures long-term sustainability due to proper decisions.

Hence the model on EIMS suggests the following options and actions for the sensitive areas of Karnataka.

Options for Environmental Information Management System: An Action

I. Expand Knowledge on the dynamics of EIMS

Much is uncertain and unknown about the structure and multiple functions of ecological and environmental diversity. Knowledge about the functions of ecological-diversity, synergies and complimentary ties, interactions within ecosystems, ecological processes within soils and interactions with the atmosphere and water, is rudimentary.

Actions: Supportive studies on dynamics of natural resources of the state are to be initiated. The extent of landraces, farmers stock have to be documented. The pattern of distribution of landraces in agroecosystems needs to be understood. Sufficient budget to be allocated towards such studies that evolve information and knowledge towards genetic diversity and its conservation. Advanced techniques such as GIS. Computer based formats should be adopted in generation and management of such information and knowledge.

II. Promote local adaptive management of ecological diversity.

Variation within and among -ecosystems is enormous. Daily, seasonal and longer-term changes in the spatial structure of crop genetic diversity are apparent at the broad landscape level right down to small plots of cultivated land. These spatio-temporal dynamics have major implications for the way environmental diversity is managed, how, by whom and for what purpose. It

calls for flexible responses, mobility and local level adaptive resource management in which local users of crop genetic diversity. This suggests new practical avenues for technical support in which land users' own priorities, knowledge, perspectives, institutions, practices and indicators gain validity

Actions:

1. Identification of ecological reserves and help to maintain insitu
2. Ensure the farmers and local institutions to maintain the stock that is in practice and the environment that support the practice.
3. Encourage for mass reservoirs of crops, of varied cultivars that will evolve as well manage the resources for the future need.

III. Support local participation in planning and management

Decisions about what ecological & environmental habitat is to be conserved, how it should be managed and for whom should be based on an understanding of local livelihoods and peoples own definitions of well being. Most professionals have tended to project their own categories and priorities onto local people and landscape management. In particular, their views of the realities of the poor, and what should be done, have generally been constructed from a distance and mainly for professional convenience. This implies the adoption of a learning process approach in the management of agricultural bio diversity and its functions.

IV. Strengthen local rights and security of tenure

The legitimacy of rural peoples' claims to tenure and rights to ecological and environmental diversity are made more apparent as landscapes are re-interpreted as the product of social and ecological histories. These findings support a rights based approach to the participatory management of ecological diversity and they also have major implications for national policies on the sharing of benefits derived from the use of landscapes, bio-diversity and its end products.

Guaranteeing the right of farmers to save and conserve is crucial in this connection. Failure to enshrine these rights in national legislation and policy practice may lead to inequitable benefit sharing schemes and conflicts that could undermine the sustainable management of ecological -diversity and food security.

Actions: 1. Documentatuon and maintainance of village environmental - profile, to honour local rights (Box-1).

2. Initiation and managing village level environmental database

3. Managing local level mass reservoirs and genetic reservoirs.

V. Reform trade policies, markets and economic incentives

Economic instruments are key to sustaining ecological -diversity and its multiple functions. Trade policies, markets, subsidies and economic incentives

must reinforce the objectives of the International Convention on Biological Diversity rather than contradict or actively undermine them. A multilevel and systemic approach to economic transformation will often be needed to reform trade, taxation and public spending aimed at sustaining crop genetic diversity.

- Actions:**
1. Encouraging and ensuring the local markets for the diversity managed.
 2. Access and manage the resources at local and decentralized way by farm societies, and agricultural department.

Box –1

Village Environmental Profile

This document will represent the entire ecological and environmental profile of the village and presents a methodology to conserve and manage such resources for any village of the state.

Task that it will address

- The ecological diversity in the village.
- The dynamics of the biopotentials for the ecological diversity
- Documentation of the status of the over all environment and specific environmental information if any.

4.3 Future line of work

From the study conducted it was realized, the following study need to be taken in the similar line so as to full fill the academic and research needs.

- To study the specific action on developing the environmental agenda for the conservation of local resources.
- A detailed study on the environmental information access and the related public policy can be made.
- Environmental knowledge and oral traditions could be studied and documented.
- A study on the potential of activities of the movement may be initiated.
- Impact of the environment movements in reality has to be studied.
- Environmental movements in democratic set up could be seriously researched for their strength and weaknesses in application of conservations.
- Access of environmental information and policy conflicts of democratic set up may be studied.

4.5 Conclusions

The present Study on the Environmental Concerns through Environmental Information Management and its impact on building public awareness in sensitive zones of Karnataka, explored the exclusive possibilities of understanding the potential of movements and the potential of information generated. Some of the conclusions drawn with the study are as follows.

- The study has shown the strengths of information in ecological concerns and there by conservation of natural resources.
- It was learnt during the study that, the activities of the movement which are alternative in dissemination of knowledge have tremendous potential.
- People participation in information dissemination in ecological movements is crucial and forms the important part of the process.
- Environmental action are always more public oriented.
- People always opt governmental responsibility in environmental conservation.
- Habitat conservation is more important for the people and land serves the major source of their needs.

- Ecological concerns some times are not just database oriented, it is governed by few emotional factors. People attribute their right for the emotional behavior also.

As the study mainly aimed at information management the target it realized was the reality of information with ecology. Hence the present study explored the possibility of information in natural resource conservation..

SUMMARY

V. SUMMARY

The present Study on the Environmental Concerns through Environmental Information Management and its impact on building public awareness in sensitive zones of Karnataka, explored the exclusive possibilities of understanding the potential of movements and the potential of information generated. Some of the important observations and study accomplishments were drawn and are summarized as follows.

A study on perception of environmental information management for ecological concerns in river Tunga catchment area in Shimoga and Chikkamagalur district was conducted. A Delphi type of study was done through the opinion survey across the people of the study area covering the different section of people. It included the Farmers, Scientists, students, Business people, House wives, College girls, Service persons, Social workers professionals and artisans.

The highlights of this study are:

The people's profile included farmers to professionals, social thinkers to scientists, Artisans to students and housewives. The average ages of the people included 15 to 75, indicated the coverage of 60 years difference in experience, a normal Indian age, said to be life achievement. It also considered the young perception to the experienced. A good gender ratio of 6.3 : 3.9 (126 males and 74 females) was considered in the study.

67 % of the people of the Tunga catchment area preferred land related information. For the majority of people, land meant a major supporting factor, the other prime issues such as vegetation, forest, gardens and animals every thing included under land. This eco -sensitive zone of Western Ghat land is most precious and threatened, mainly because the catchment area disturbances includes, mining and land related aspects.

The source of information on environment in the study area included, oral knowledge to several published books etc. The data obtained on source of their information has been presented in Table 2, and depicted in Fig. 3. Majority of the people depended for information on books (60.5%). There was a minimum response on schools and colleges as a source of environmental information. Public Contact and oral sources were 12.5% and 19% respectively, bearing a considerable share of information.

People's interest on environmental information envisaged as casual, duty and as right to the response of public interest on Environmental Information. As many as 81.5% of the respondents, felt their interest on environmental information was their right. However, very few responses of 6.5% resulted as casual interest.

Participatory management in environmental information: People of the area have tremendously experienced the ecological issues and information management options of Tunga, one of the major river that takes its birth and runs in the Western Ghat area. The rivers attachment to public is quite influential. It was not only as source of natural water reservoir that serves them perennially, but also the emotional attachment as they have seen through out their lifetime.

People of the study area as well in any environmentally sensitive place, participate in the public issues concerned with environment depending on the their awakened interest on environment. Perhaps they use different mechanism and ways for the response. But it essentially depends on how they are exposed to information or the access to information.

Handling of environmental information pertains to their use of skill in knowing information, environmental sensitization of their place, and such factors accounts to management aspects. Environmental situation of their natural resources such as land water and air were the prime elements upon which situational management is realized. However the study area has been an important place of biological interest, being one of the eighteen hot spots of biological diversity of the world, the vegetation and forest were also the important ones.

Development of Environmental concerns was studied. It was not surprising that everybody were of the opinion that the development of ecological concerns has been with them. 100 per cent acceptance, for development was obtained on inquiry.

The rate of ecological concerns developed amongst the people of the study area was established. Majority of them (80.5%) opined that the rate of development as good. Very few Viz. 4.5 % opined that poor development was evolved. However 10 percent of them agreed upon the development as excellent with 5 percent as moderate development.

Ecological issues attributed through EIM were carried out. It was explored by understanding their opinion as their wanting for life such as Better life, Climate Health, food Security, Economy, Safe water, Property, New generation and Clean breath. The details were in the order of Safe water (43%) Food Security (18.5%) Better life (14%) Health (7.5%) New generation (5.5%) Clean breath (5.5%) Habitation (2.5%) Climate (2%) Economy (1%) Property (0.5%). The following figure depicts the people's version.

People's actions on environmental disturbances were different; the responses could be different from emotional response to initiate legal responses. It was indicated that public action could be one of the important action. As the people were not given any right on such matters they were expected to give responses, which may not be individual actions.

People of this area are aware of the movement in conservation and have experienced the action in return. As the public administration's role is major and also the people's strength in democratic set up are known to them they have good response on these issues. Public action in every environmental movement has been an important agenda and has always been played in development of ecological concerns.

The most important part of the study, in this area was the information management. Information pertains to environment of the area and has several ways of generation and dissemination. But the public version and their reaction of the way that is being handled were of interest. The study was made to understand the information management and its role in evolving the ecological concerns.

Hence it was hypnotized to realize the importance of information management in building the ecological concerns. Ecological concerns may vary differently for different people, but their ultimate interest in conservation was overall protection of their habitat. In global agenda also if the people realized the aspects of conservation as their habitat, it was emphasized as the target meet. Hence in that sense ecological development was taken under this study.

Difficulties of information handling for the public were in the order of Collection, Sharing, Access and Updating. As many as 83 percent of people opined that the collection of the information itself is difficult. Many expressed that in the access to public sharing of information form, the administration was very poor. Few people were very unhappy, about the treatment to public from the government.

Sharing of information and access to information were not realized much while on study. It was also the case when the updating was mentioned to them. This could be supported by many of the information access studies conducted by various researchers such as Madhav Gadgil and others who have opined the public access and sharing of information in similar lines.

Building ecological concerns through environmental information has been the hypothesis of the study. It has been in any of the process of conservation, ecological security and attachment and Eco friendly life. As many as 65.5 percent of opinions were towards the future security. They were of the opinion that the main strength of the information is to provide the future ecological security; there by having conservation of nature for better life.

Two case studies were conducted.

- I) On the environmental concerns through the Environmental movements in River Tunga catchment, and
- II) On the Western Ghat biodiversity network concerns in ecological awareness were taken up.

Case studies especially on the impacts of Environmental information management on the sensitive areas were conducted. One case study was conducted in the area of catchment of River Tunga.

There are few movements that have taken place in different part of the state. Each was for saving their environment vis-à-vis their habitat. Some of them are known in the state that have created considerable attention of the public as well the administrators.

River Tunga originates from western Ghat area from a deep forested area. River Bhadra also originates from Western Ghat area, but both run different areas and meet at a place after traveling several kilometers and form the river Tungabhadra. People believe that the river Tunga is known for the drinking water quality, very sweet and tasteful. The entire catchment of the river is spread mainly in two districts namely Shimoga and Chikkamagalore. Particularly the talukas like Sringeri and Koppa in Chikkamagalore and Thirthahalli Shimoga district are very sensitive from the river point of view.

Many public institutes including the local political parties supported the entire movement. As many as 61 organizations supported the movement. This has influenced the people and participation was ensured. The information handling details included the following.

Oral meeting

Personal discussions

Village meets

Jathas in village

The importance of the movement was with its campaigns. It covered Over 75 villages, with 100s of meetings, and 1000s in each time participation was experienced. No. of pamphlets carried ecological concerns made were Over 0.1 million and the. No. of posters brought the message included Over 25,000.

Case Study II

Western Ghat biodiversity network (WGBN) and its information concerns on environmental conservation.

The present study was taken up to understand the processes of the academic and research perspectives on ecological concerns. The study area has been under the Western Ghat area, and has shown the concerns related to the Western Ghat, hence the present case study was initiated. The network was an excellent coordinated efforts of the different institutions and scientists with student participation. Several colleges, the list is provided later, - had participated in the biodiversity documentation and developing the information there by relating the concerns. The following details have been obtained in the

process of understanding and during the study period. This was conducted by, visiting the sites, as well as meeting the resource persons of the network.

The summarized details are as follows.

Complex natural systems such as soils, groundwater, and populations of disease vectors like mosquitoes exhibit a great deal of variation in space and time. Documenting such variation is essential for good management of environmental resources; it can also provide for students and teachers excellent opportunities for first hand scientific observations.

This study as an experiment, focusing on inventorying and monitoring of biodiversity of the Western Ghats initiated in early 1994, this experiment involves a network of over 20 undergraduate colleges collaborating with ecologists at the Indian Institute of Science in Bangalore.

Experience gained so far in this programme suggests that such field research could serve as a valuable teaching device, as well generate useful inputs for decentralized management of natural resources at the panchayat and district levels.

Complexity and diversity are the new frontiers of science. The focus is now on systems like climate, and on the extent to which it will change as a consequence of an increase in the concentrations of greenhouse gases. It is on the diversity of life, and on the rate at which this is being eroded through manifold human impacts. It is on contagious diseases like AIDS and on understanding how they spread as a result of human social behavior. The most

significant challenges before science today lie in understanding complex systems with a great diversity of behaviors in space and time .

This is not the case when dealing with relatively simpler physical, chemical systems. Such systems are more universally accessible for investigations. In consequence, relatively readily accessible facts tend to be already known, and discovering new facts calls for elaborate, expensive experimental set ups, highly purified, expensive chemicals. As citizens of a relatively resource poor country, Indian scientists are at a disadvantage in working with such simpler systems. But India with its large numbers of trained men and women could be at a considerable advantage and make significant contributions worthy of it, if our scientific community purposefully addresses the challenge of working at the new frontiers of science; of complex, diverse systems.

Institutions of higher learning and scientific agencies such as Botanical and Zoological Surveys of India need to be encouraged to actively work with undergraduate colleges in such programmes, perhaps through award of special grants. At the same time, we need to create mechanisms for using the results of such research as inputs for a decentralized process of development planning at the Panchayat and District Levels.

Salient Achievements of case studies

Linkages developed: As an action research, the study has developed a good net work of activists, environmental concern people, teachers, and local people of sensitive area of the case study proposed. The people of the study interest are the people representing the different class of the society in the state. The

study has helped to explore the possible fields of environmental interest such as the following

1. Biodiversity: Flora & Fauna, Domesticated diversity and Farming diversity etc.
2. Conservation potential : Native resources and sustainable strengths
3. Knowledge Discovery : Awareness building, Adaptable practices and environmental strengths of conservation strategies.

Study concluded with developing the Environmental information management systems for ecologically sensitive area. Both natural processes and human management have generated and sustained a vast array of environmental and ecological diversity. Within sensitive systems this sensitivity performs many closely interrelated socio-economic and environmental functions, including promoting food and livelihood security; maintaining productive and environmental sustainability; and contributing to resilient development.

But, this environmental information management systems referred, as EIMS is being needed may not be a sole tool but as a supportive tool embedded in the developing strategies. Environmental information management system is the management of database with regards to a given habitat used directly or indirectly for conserving the environment and ecological interest. The diversity of interests includes the natural resources, biodiversity and those in the wider environment that support the given ecological systems.

Conservation has always drawn the attention and interest of variety of publics, institutions with set objectives. Considering the contributions of ecological diversity was realized over the years of understanding and have led to conservation interest and drawing the attention of people and institution and their by policies.

Hence the model on EIMS suggests the following options and actions for the sensitive areas of Karnataka. Options for Environmental Information Management System through some actions were recorded. They were

- Expand Knowledge on the dynamics of EIMS
- Promote local adaptive management of ecological diversity.
- Support local participation in planning and management
- Strengthen local rights and security of tenure
- Reform trade policies, markets and economic incentives

The study has shown the strengths of information in ecological concerns and there by conservation of natural resources. It was learnt during the study that, the activities of the movement, which are alternative in dissemination of knowledge, have tremendous potential. People's participation in information dissemination in ecological movements is crucial and forms the important part of the process.

- Environmental actions are always more public oriented.
- People always opt governmental responsibility in environmental conservation.

- Habitat conservation is more important for the people and land serves the major source of their needs.
- Ecological concerns some times not just database oriented, it is governed by few emotional factors. People attribute their right for the emotional behavior also.

The present study explored the possibility of information in natural resource conservation. The study mainly aimed at information management as the target and it realized the reality of information with ecology as concerned. The information management and its linkages with building the ecological concerns was the hypothesis. It realized the linkages in real time. Understanding may take long from the people's point of view. However they always led the sources of information as invisible entity and were not much bothered.

People's participation in handling the information was experience oriented, had oral tradition, and local expertise and association with the resources and availability. The access to information was their real times botheration as they felt public were not accessed to the governmental database.

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ANNEXURES

ANNEXURE I

SCHEDULE FOR INFORMATION FROM GENERAL PUBLIC IN THE STUDY AREA ON ENVIRONMENTAL INFORMATION MANAGEMENT

I. General Information :

1. Name : _____ Age: _____ Years
2. Address: _____
3. Gender : _____ Male/Female
4. Main Occupation : Farmer/ Business/ House
wife/Professional/Teachers/Govt. service/ Student/ Professional
(Doctor, Engineer)/Scientists(Sc. Lecturers)
a. Specify-----
5. Marital Status : _____ Single/Married
6. Education : a) Uneducated b) Primary School c) 5-7 Std.
d) High School e) Graduate f) Above

II. Information on Environmental Information

1) What is your preference for environmental knowledge?

- a) Land b) Vegetation c) Water
d) Air e) Animals f) Others

2). Source of Environmental Information :

- a) Oral b) School or college c) Books
d) Public Contact e) Others

3). Interest on Environmental Information:

- (a) Casual (b) Duty c) Right d) Others (specify) -----

4) Do you use your own skills or information to exercise the conservation?.

- Yes No

5) What was the situation?

- a) Land b) Water c) Vegetation/forest d) Others

6) What was your experience regarding the participation?

- a) Excellent b) Very good c) Good d) Moderate e) Poor

7) Do you think this type of information needs a proper updating and Management?

- Yes No

8) Which do you feel as important among the following

- a) Right of awareness among people
b) Local Data Base development
c) Personal Data Base
d) Managing the information by administration
e) Any other

II. Information on Environmental concerns (Material & Methods):

1) Do you think environmental concerns can be developed through the environmental information.

- Yes No.

2) How do you rate the environmental concerns developed through the environmental information.

- a) Excellent b) Good
- c) Moderate d) Poor

3) Which of the following system for you have made to develop concerns towards the ecological issues.?

- 1) Better life 2) Climate 3) Health 4) Food Security
- 5) Economy 6) Safe water 7) Ownership on property
- 8)New generation 9) clean breath 10) Habitation
- 11) Others (Specify)

4. What action you prefer to execute while on ecological concerns to be Taken:

- a) Emotional expression b) Public action c) Protest
- d) Move with the mass e) Write to authorities f) Others

5) Methods of Execution of your action: a) Individual b) Group

6) What do you know any of the systems to be useful by conserving it for future.

- Yes No.

7). What are the difficulties, drawbacks, weaknesses in the system or management of information

- a) Collection of information b) Sharing c) Access d) Updating

8) What are the strengths of environmental information towards developing the ecological concerns?

- a) Conservation b) Future security
- c) Right of ecological attachment d) Eco-friendly Life

9) Do you think this practice needs a special attention of the following,

- a) Public b) Institutions
- c) Government

10) Any Other information :

Annexure -II

Information from people in the study area on environmental information management and ecological concerns:
(Consolidated data Sheet)

1. General Information :

Age : 40 -75 yrs Gender Ratio: 8:2 Occupation : Farming Marital Status: All married Edn. 5th - graduates

(II: Information on Environmental Knowledge)

(Information on Environmental Concerns)

Sl.No.	PEI	SEI	IEL	ExEI	Sit.	Part	In.	NM	Type	EC by EI	Rate	Issue	Action	Mtd	Use	Dif	Strength	Attn
1.	L	O/B	R	Y	L	G	Y	Y	Aw	Y	G	4	B	G	Y	A	B	C
2.	L	O/B	R	Y	L	G	Y	Y	Aw	Y	G	4	B	G	Y	A	B	C
3.	L	O	R	Y	L	E	Y	Y	Aw	Y	G	4	B	G	Y	A	B	C
4.	W	B	R	Y	W	G	Y	Y	Aw	Y	G	6	E	G	Y	A	B	C
5.	L	S/B	R	Y	L	E	Y	Y	Aw	Y	G	4	B	G	Y	A	B	C
6.	L	B	D	Y	L	G	Y	Y	Aw	Y	G	4	B	G	Y	A	B	C
7.	L	B	R	Y	L	E	Y	Y	Aw	Y	G	4	B	G	Y	A	B	C
8.	W	B	R	Y	W	G	Y	Y	Aw	Y	G	6	E	G	Y	A	B	C
9.	L	B	R	Y	L	E	Y	Y	Aw	Y	G	6	B	G	Y	A	B	C
10.	W	PC	R	Y	W	E	Y	Y	Aw	Y	G	6	B	G	Y	A	B	C
11.	L	O	C	Y	L	E	Y	Y	Aw	Y	G	6	C	G	Y	A	B	C
12.	L	B	R	Y	L	G	Y	Y	Aw	Y	G	6	B	G	Y	A	B	C
13.	L	B	R	Y	L	G	Y	Y	Aw	Y	G	6	C	G	Y	A	B	C
14.	L	B	R	Y	L	G	Y	Y	Aw	Y	G	6	B	G	Y	A	B	C
15.	W	B	R	Y	W	E	Y	Y	Aw	Y	G	9	C	G	Y	A	B	C
16.	L	B	R	Y	L	G	Y	Y	Aw	Y	G	6	B	G	Y	A	B	C
17.	L	B	R	Y	L	E	Y	Y	Aw	Y	G	6	C	G	Y	A	B	C
18.	W	O/B	R	Y	W	G	Y	Y	Aw	Y	G	6	C	G	Y	A	B	C
19.	L	O/B	R	Y	L	G	Y	Y	Aw	Y	G	6	C	G	Y	A	B	C
20.	L	O/B	R	Y	L	G	Y	Y	Aw	Y	G	6	B	G	Y	A	B	C

Information from people in the study area on environmental information management and ecological concerns:
(Consolidated data Sheet)

I. General Information :
Age : 15 -22 yrs Gender Ration: 6:4 Occupation : Student Marital Status: All unmarried Edn. 10th - graduates

(II: Information on Environmental Knowledge)										(Information on Environmental Concerns)								
Sl.No.	PEI	SEI	IEI.	ExEI	Sit.	Part	In.	NM	Type	EC by EI	Rate	Issue	Action	Mtd	Use	Dif	Strength	Attn
1.	L	B	R	Y	L	VG	Y		Aw	Y	E	1	B	G	Y	A	B	A
2.	A	B	R	Y	L	G	Y		Aw	Y	E	1	G	I	Y	B	C	B
3.	L	S/B	R	Y	L	E	Y		Aw	Y	G	1	G	I	Y	B	A	C
5.	L	S/B	R	Y	L	E	Y		Aw	Y	G	4	B	G	Y	A	B	B
6.	L	S/B	D	Y	L	G	Y		Aw	Y	G	1	B	G	Y	A	B	C
7.	L	B	R	Y	L	E	Y		Aw	Y	G	1	E	G	Y	B	C	B
8.	W	B	R	Y	W	VG	Y		Aw	Y	E	6	E	G	Y	A	C	B
9.	L	B	R	Y	L	E	Y		Aw	Y	G	6	B	G	Y	C	B	C
10.	W	PC	R	Y	W	E	Y		Aw	Y	G	1	B	G	Y	C	A	B
11.	L	S	R	Y	L	E	Y		Aw	Y	E	1	C	G	Y	C	C	C
12.	V	B	R	Y	L	G	Y		Aw	Y	G	1	B	G	Y	C	A	C
13.	A	B	R	Y	L	G	Y		Aw	Y	G	1	C	G	Y	C	C	C
14.	L	B	R	Y	L	E	Y		Aw	Y	E	1	B	G	Y	A	A	B
15.	W	B	R	Y	W	E	Y		Adm	Y	G	1	C	G	Y	A	B	B
16.	L	B	D	Y	L	VG	Y		Aw	Y	G	1	A	G	Y	C	A	C
17.	An	B	R	Y	L	E	Y		Aw	Y	G	10	C	G	Y	A	B	C
18.	W	S	R	Y	L	G	Y		Aw	Y	G	10	C	G	Y	B	C	C
19.	L	S	R	Y	L	M	Y		Aw	Y	G	1	B	G	Y	B	C	B
20.	L	S	R	Y	L	M	Y		Aw	Y	G	1	B	G	Y	B	C	B

Information from people in the study area on environmental information management and ecological concern:

(Consolidated data Sheet)

1. General Information :

Age : 25-55 yrs Gender Ration: 0:10 Occupation : House Wife Marital Status: married Edn. 10th - Post graduates

(II: Information on Environmental Management)										(Information on Environmental Concerns)								
Sl.No.	PEI	SEI	IEI.	ExEI	Sit.	Part	In.	NM	Type	EC by EI	Rate	Issue	Action	Mtd	Use	Dif	Strength	Attn
1.	L	O/B	R	Y	L	G	Y	Aw	Y	Y	G	1	A	G	Y	A	A	C
2.	W	O/B	R	Y	W	M	Y	Aw	Y	Y	G	8	B	G	Y	A	A	C
3.	L	O	C	Y	L	M	Y	Aw	Y	Y	G	1	B	G	Y	A	A	C
4.	W	B	R	Y	W	G	Y	Aw	Y	Y	G	1	E	G	Y	A	B	C
5.	L	S/B	R	Y	L	E	Y	Aw	Y	Y	G	8	C	G	Y	A	A	A
6.	W	B	D	Y	W	G	Y	Aw	Y	Y	P	8	B	G	Y	A	B	C
7.	L	B	C	Y	L	M	Y	Aw	Adm	Y	G	1	C	G	Y	A	C	A
8.	W	B	R	Y	W	G	Y	Adm	Y	Y	G	8	C	G	Y	A	C	C
9.	L	B	R	Y	L	M	Y	Aw	Aw	Y	P	1	B	G	Y	A	C	A
10.	W	PC	R	Y	W	M	Y	Aw	Aw	Y	G	1	B	G	Y	A	B	A
11.	L	O	C	Y	L	M	Y	Aw	Aw	Y	G	1	B	G	Y	A	C	A
12.	W	B	C	Y	L	G	Y	Aw	Aw	Y	M	3	B	G	Y	A	B	C
13.	L	B	R	Y	L	M	Y	Aw	Aw	Y	G	6	C	G	Y	A	A	C
14.	L	B	R	Y	L	G	Y	Adm	Adm	Y	G	3	B	G	Y	A	B	C
15.	L	B	R	Y	W	M	Y	Aw	Aw	Y	M	9	B	G	Y	A	A	A
16.	W	B	C	Y	W	G	Y	Aw	Aw	Y	G	4	B	G	Y	A	B	C
17.	W	B	R	Y	W	E	Y	Adm	Adm	Y	P	4	C	G	Y	A	C	C
18.	W	S/B	R	Y	W	G	Y	Aw	Aw	Y	M	10	B	G	Y	A	B	A
19.	L	S/B	C	Y	L	G	Y	Aw	Aw	Y	M	9	C	G	Y	A	B	C
20.	W	S/B	R	Y	W	M	Y	Aw	Aw	Y	G	8	B	G	Y	A	B	A

Information from people in the study area on environmental information management and ecological concerns:
(Consolidated data Sheet)

1. General Information :

Age : 30 -55 yrs Gender Ration: 6:4 Occupation : Teachers Marital Status: All married Edn. graduates

(II: Information on Environmental Knowledge) (Information on Environmental Concerns)

SLNo. PEI SEI IEL. ExEI Sit. Part In. NM Type EC by EI Rate Issue Action Mtd Use Dif Strength Attn

1.	W	B	R	Y	W	G	Y	Aw	Y	G	1	B	G	Y	A	A	C
2.	L	B	R	Y	L	G	Y	Aw	Y	G	2	B	G	Y	A	A	C
3.	L	B	D	Y	L	E	Y	Aw	Y	G	4	B	G	Y	A	A	C
4.	W	B	R	Y	W	G	Y	Aw	Y	G	4	E	G	Y	A	A	C
5.	L	S/B	R	Y	L	E	Y	Aw	Y	G	4	B	G	Y	A	B	C
6.	L	B	D	Y	L	G	Y	Aw	Y	G	9	B	G	Y	A	B	C
7.	L	B	R	Y	L	E	Y	Aw	Y	G	8	B	G	Y	A	B	C
8.	W	B	R	Y	W	G	Y	Aw	Y	G	9	E	G	Y	D	B	C
9.	L	B	R	Y	L	G	Y	Aw	Y	G	6	B	G	Y	A	C	C
10.	W	PC	R	Y	W	G	Y	Aw	Y	G	5	B	G	Y	A	B	C
11.	L	B	D	Y	L	G	Y	Aw	Y	G	4	C	G	Y	A	B	C
12.	L	B	R	Y	L	G	Y	Aw	Y	G	3	B	G	Y	A	C	C
13.	L	PC	R	Y	L	G	Y	Aw	Y	G	2	C	G	Y	D	C	C
14.	L	B	D	Y	L	G	Y	Aw	Y	G	1	B	G	Y	A	A	C
15.	L	B	R	Y	L	G	Y	Aw	Y	G	1	C	G	Y	A	A	C
16.	W	B	R	Y	L	G	Y	Aw	Y	G	1	B	G	Y	A	A	C
17.	W	B	R	Y	L	E	Y	Aw	Y	G	6	C	G	Y	A	C	C
18.	W	PC	R	Y	L	G	Y	Aw	Y	G	8	C	G	Y	A	D	C
19.	L	PC	R	Y	L	G	Y	Aw	Y	G	9	C	G	Y	A	D	C
20.	L	PC	R	Y	L	G	Y	Aw	Y	G	10	B	G	Y	A	D	C

Information from people in the study area on environmental information management and ecological concern:
(Consolidated data Sheet)

1. General Information :

Age : 28 -50 yrs Gender Ration: 7:3 Occupation : Scientist (Lecturers) Marital Status: All married Edn. Post graduates

(II: Information on Environmental Management)

(Information on Environmental Concerns)

Sl.No.	PEI	SEI	IEL.	ExEI	Sit.	Part	In.	NM	Type	EC by EI	Rate	Issue	Action	Mtd	Use	Dif	Strength	Attn
1.	L	B	R	Y	L	E	Y	Aw	Y	Y	G	1	E	G	Y	A	A	C
2.	L	B	R	Y	L	G	Y	Aw	Y	Y	G	2	B	G	Y	A	A	C
3.	L	B	R	Y	L	E	Y	Aw	Y	Y	G	4	B	G	Y	D	B	C
4.	W	B	R	Y	W	E	Y	Aw	Y	Y	G	2	E	G	Y	D	A	C
5.	A	B	R	Y	A	E	Y	Aw	Y	Y	G	3	B	G	Y	A	B	C
6.	L	B	D	Y	L	G	Y	Aw	Y	Y	G	7	B	G	Y	A	B	C
7.	A	B	R	Y	L	E	Y	Aw	Y	Y	G	4	B	G	Y	D	C	C
8.	W	B	R	Y	W	G	Y	Adm	Y	Y	G	8	E	G	Y	A	B	C
9.	L	B	R	Y	L	E	Y	Aw	Y	Y	G	8	B	G	Y	B	B	C
10.	L	B	R	Y	W	E	Y	Aw	Y	Y	G	8	B	G	Y	A	A	C
11.	L	B	D	Y	L	E	Y	Adm	Y	Y	G	6	E	G	Y	B	B	C
12.	AN	B	R	Y	An	G	Y	Aw	Y	Y	G	6	B	G	Y	A	B	C
13.	L	B	R	Y	L	E	Y	Aw	Y	Y	G	9	E	G	Y	C	A	C
14.	L	B	R	Y	L	G	Y	Aw	Y	Y	G	10	B	G	Y	A	B	C
15.	L	B	R	Y	L	E	Y	Adm	Y	Y	G	1	E	G	Y	A	B	C
16.	L	B	C	Y	L	G	Y	Aw	Y	Y	G	8	E	G	Y	A	A	C
17.	W	B	R	Y	L	E	Y	Aw	Y	Y	G	4	E	G	Y	A	B	C
18.	W	B	R	Y	W	G	Y	Aw	Y	Y	G	3	C	G	Y	A	B	C
19.	L	B	R	Y	L	E	Y	Aw	Y	Y	G	6	C	G	Y	A	B	C
20.	L	B	R	Y	L	G	Y	Aw	Y	Y	G	6	C	G	Y	A	B	C

Information from people in the study area on environmental information management and ecological concern:
(Consolidated data Sheet)

1. General Information :

Age :30 -65 yrs Gender Ratio: 8:2 Occupation : Professional Marital Status: All married Edn. graduates

(II: Information on Environmental Knowledge)

(Information on Environmental Concerns)

Sl.No.	PEI	SEI	IEI.	ExEI	Sit.	Part	In.	NM	Type	EC by EI	Rate	Issue	Action	Mtd	Use	Dif	Strength	Attn
1.	W	B	R	Y	W	G	Y	Y	Aw	Y	G	3	C	I	Y	A	B	C
2.	L	B	R	Y	L	G	Y	Y	Aw	Y	G	3	B	G	Y	A	B	A
3.	W	B	R	Y	W	G	Y	Y	Aw	Y	G	4	B	I	Y	A	B	C
4.	L	B	R	Y	W	G	Y	Y	Aw	Y	G	3	E	G	Y	C	B	C
5.	L	B	R	Y	L	G	Y	Y	Aw	Y	E	3	B	I	Y	A	B	C
6.	W	B	R	Y	W	G	Y	Y	Aw	Y	G	3	B	G	Y	A	A	A
7.	L	B	R	Y	L	G	Y	Y	Aw	Y	G	3	B	I	Y	A	B	C
8.	W	B	R	Y	W	G	Y	Y	Aw	Y	G	6	B	I	Y	C	B	C
9.	L	B	R	Y	L	G	Y	Y	Aw	Y	E	3	E	I	Y	A	B	C
10.	W	B	R	Y	W	G	Y	Y	Aw	Y	G	3	B	I	Y	A	A	C
11.	W	B	R	Y	W	G	Y	Y	Aw	Y	G	3	B	I	Y	C	B	A
12.	W	B	R	Y	W	G	Y	Y	Aw	Y	G	3	B	I	Y	A	B	A
13.	W	B	R	Y	W	G	Y	Y	Aw	Y	G	6	C	G	Y	A	B	C
14.	W	B	R	Y	W	G	Y	Y	Aw	Y	G	6	B	G	Y	C	B	C
15.	W	B	R	Y	W	G	Y	Y	Aw	Y	G	9	E	I	Y	A	B	A
16.	L	B	R	Y	L	G	Y	Y	Aw	Y	G	6	E	G	Y	C	B	C
17.	W	B	R	Y	W	G	Y	Y	Aw	Y	G	6	C	I	Y	B	B	A
18.	W	B	R	Y	W	G	Y	Y	Aw	Y	E	6	C	I	Y	A	B	C
19.	L	B	R	Y	L	G	Y	Y	Aw	Y	G	4	C	I	Y	A	B	A
20.	L	B	R	Y	L	E	Y	Y	Aw	Y	E	4	E	I	Y	A	B	A

Information from people in the study area on environmental information management and ecological concerns
(Consolidated data Sheet)

1. General Information :

Age : 30 -60 yrs Gender Ratio: 8:2 Occupation : Social worker Marital Status: 16 married 4 nm Edn. graduates

(II: Information on Environmental Management)										(Information on Environmental Concerns)								
SLNo.	PEI	SEI	IEL	ExEI	Sit.	Part	In.	NM	Type	EC by EI	Rate	Issue	Action	Mtd	Use	Dif	Strength	Attn
1.	L	O	D	Y	W	E	Y	Aw	Y	Y	G	4	B	G	Y	B	A	C
2.	L	O/B	D	Y	L	E	Y	Adm	Y	Y	G	6	B	G	Y	A	A	C
3.	L	PC	R	Y	L	E	Y	Aw	Y	Y	G	4	B	G	Y	B	A	C
4.	L	PC	D	Y	W	G	Y	Aw	Y	Y	E	5	B	G	Y	A	A	C
5.	L	PC	R	Y	L	E	Y	Aw	Y	Y	G	4	B	G	Y	A	A	C
6.	L	PC	D	Y	L	E	Y	Adm	Y	Y	E	4	B	G	Y	B	A	C
7.	L	B	R	Y	L	E	Y	Aw	Y	Y	E	4	B	G	Y	A	A	C
8.	L	PC	R	Y	W	G	Y	Adm	Y	Y	E	1	B	G	Y	B	A	C
9.	L	B	D	Y	L	E	Y	Aw	Y	Y	G	4	B	G	Y	A	A	A
10.	W	PC	R	Y	W	E	Y	Aw	Y	Y	E	6	B	G	Y	A	A	C
11.	L	O	C	Y	L	E	Y	Aw	Y	Y	E	6	B	G	Y	B	A	C
12.	L	PC	D	Y	L	G	Y	Aw	Y	Y	G	6	B	G	Y	A	A	C
13.	W	B	D	Y	W	E	Y	Adm	Y	Y	G	6	C	G	Y	C	A	C
14.	L	O	D	Y	L	G	Y	Aw	Y	Y	E	6	B	G	Y	A	A	C
15.	A	PC	D	Y	W	E	Y	Aw	Y	Y	E	9	C	G	Y	C	A	C
16.	L	PC	R	Y	L	G	Y	Aw	Y	Y	E	6	B	G	Y	A	A	C
17.	W	C	D	Y	L	E	Y	Aw	Y	Y	G	6	C	G	Y	A	A	A
18.	L	O	D	Y	W	G	Y	Aw	Y	Y	G	6	C	G	Y	A	A	C
19.	L	PC	D	Y	L	G	Y	Aw	Y	Y	E	6	C	G	Y	B	A	C
20.	L	PC	D	Y	W	E	Y	Aw	Y	Y	E	6	B	G	Y	A	A	C

Information from people in the study area on environmental information management and ecological concern:
(Consolidated data Sheet)

I. General Information :
Age : 25 -55 yrs Gender Ration: 10:0 Occupation : Artisans Marital Status: All married Edn. 5th - graduates

(II: Information on Environmental Knowledge)										(Information on Environmental Concerns)								
Sl.No.	PEI	SEI	IEI.	ExEI	Sit.	Part	In.	NM	Type	EC by EI	Rate	Issue	Action	Mtd	Use	Dif	Strength	Attn
1.	W	O	R	Y	W	G	Y		Aw	Y	G	6	D	G	Y	A	B	C
2.	W	B	R	Y	W	G	Y		Aw	Y	G	6	B	G	Y	A	B	C
3.	L	O	D	Y	L	M	Y		Aw	Y	G	6	D	G	Y	A	B	C
4.	W	B	R	Y	W	M	Y		Aw	Y	G	6	D	G	Y	A	B	C
5.	L	PC	R	Y	L	M	Y		Aw	Y	G	6	B	G	Y	A	B	C
6.	L	B	D	Y	L	G	Y		Aw	Y	G	4	B	G	Y	A	B	C
7.	L	B	R	Y	L	M	Y		Aw	Y	G	6	B	G	Y	A	B	C
8.	W	B	R	Y	W	G	Y		Aw	Y	G	6	E	G	Y	A	B	C
9.	L	PC	R	Y	L	M	Y		Aw	Y	G	6	B	G	Y	A	B	C
10.	L	PC	R	Y	W	E	Y		Aw	Y	G	6	B	G	Y	A	B	C
11.	L	O	D	Y	L	M	Y		Aw	Y	G	6	D	G	Y	A	B	C
12.	L	O	R	Y	L	G	Y		Aw	Y	G	6	B	G	Y	A	B	C
13.	L	O	R	Y	L	G	Y		Aw	Y	G	6	C	G	Y	A	B	C
14.	L	O	R	Y	L	G	Y		Aw	Y	G	6	B	G	Y	A	B	C
15.	W	O	R	Y	W	M	Y		Aw	Y	G	9	C	G	Y	A	B	C
16.	L	O	R	Y	W	G	Y		Aw	Y	G	6	B	G	Y	A	B	C
17.	L	O	R	Y	L	M	Y		Aw	Y	G	6	C	G	Y	A	B	C
18.	L	O	R	Y	W	G	Y		Aw	Y	G	6	C	G	Y	A	B	C
19.	L	O	R	Y	L	G	Y		Aw	Y	G	6	C	G	Y	A	B	C
20.	L	O	R	Y	L	G	Y		Aw	Y	G	6	B	G	Y	A	B	C

Information from people in the study area on environmental information management and ecological concern:
(Consolidated data Sheet)

1. General Information :

Age : 16 -25 yrs Gender Ratio: 0:10 Occupation : College girls/ working ladies Marital Status: unmarried Edn. graduates

(II: Information on Environmental Management)

(Information on Environmental Concerns)

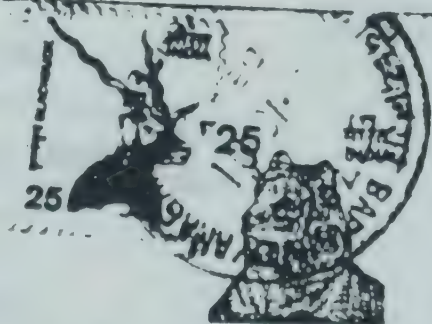
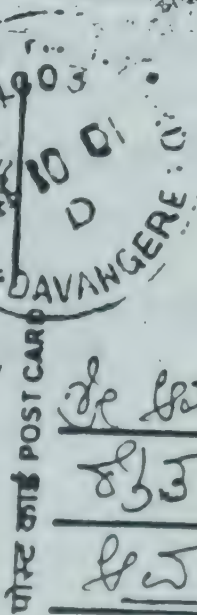
Sl.No.	PEI	SEI	IEI.	ExEI	Sit.	Part	In.	NM	Type	EC by EI	Rate	Issue	Action	Mtd	Use	Dif	Strength	Attn
1.	L	B	R	Y	L	G	Y	Aw	Y	Y	G	6	B	G	Y	A	B	C
2.	W	O/B	R	Y	W	G	Y	Aw	Y	Y	M	4	B	G	Y	A	B	C
3.	L	B	R	Y	L	G	Y	Aw	Y	Y	P	6	B	G	Y	A	B	C
4.	W	B	R	Y	W	P	Y	Aw	Y	Y	M	6	B	G	Y	A	B	C
5.	L	S	R	Y	L	P	Y	Aw	Y	Y	P	4	B	G	Y	A	B	C
6.	L	B	R	Y	L	P	Y	Aw	Y	Y	M	4	B	G	Y	A	B	C
7.	L	B	R	Y	L	G	Y	Aw	Y	Y	G	6	B	G	Y	A	B	C
8.	L	B	R	Y	W	G	Y	Aw	Y	Y	G	6	B	G	Y	A	B	C
9.	L	PC	R	Y	L	P	Y	Aw	Y	Y	G	4	B	G	Y	A	B	C
10.	L	PC	R	Y	W	P	Y	Aw	Y	Y	M	6	B	G	Y	A	B	C
11.	L	B	R	Y	L	E	Y	Aw	Y	Y	G	6	B	G	Y	A	B	C
12.	L	B	R	Y	L	M	Y	Aw	Y	Y	P	6	B	G	Y	A	B	C
13.	L	B	R	Y	L	M	Y	Aw	Y	Y	M	6	C	G	Y	A	B	C
14.	L	B	R	Y	W	P	Y	Aw	Y	Y	P	6	B	G	Y	A	B	C
15.	L	B	R	Y	W	P	Y	Aw	Y	Y	M	6	C	G	Y	A	B	C
16.	W	B	R	Y	L	P	Y	Aw	Y	Y	P	6	B	G	Y	A	B	C
17.	W	B	R	Y	W	P	Y	Aw	Y	Y	G	6	C	G	Y	A	B	C
18.	L	O/B	R	Y	W	P	Y	Aw	Y	Y	P	6	B	G	Y	A	B	C
19.	W	O/B	R	Y	W	P	Y	Aw	Y	Y	G	6	C	G	Y	A	B	C
20.	L	O/B	R	Y	L	P	Y	Aw	Y	Y	G	6	B	G	Y	A	B	C

ಕಣಿಗಾರಿಕೆ ನಿಯಮ, ಪಂಚಭೂಮಿ ಎಚ್ಚರಿಕೆ 2.10.2001

ప్రాకృతిక సందర్భం, కూడా సుదీర్ఘము నేరము మారితర
 మోరగలన్ను తడవు మళ్ళీ బడినవవరాదు? మళ్ళీ బడిన కుంగ
 ముక్తు, భద్రమరు బర్తరే దావనగో జల్లయ ర్భృతరు మణ్ణ
 ముక్తు బోక? కబ్బినాది అదిరు నది ప్రాత్రనన్ను నేరి కుడియవ
 నాదిను ఏద, బోక నుత్తరువుదు నిమగ్న నూత్రి వయ? ర్భృత
 బాంధవరే, కుదురే ముఖ సముద్ర జలం నాది. అదు నాకనాదరే
 అదియేదనే నానూ నేరము నాననదు బరత. కళిద 30 సమ్య-
 గలెల్ల 100 అది శబరమన్ను కదిదు నది నాదీ ఏద, బోకనీదగదా!

- 83.5205
22.0005

[10 ಕಂಪೆ ಕಾಡು ನಾಲ್ಕು ಇರಾ
ಪ್ರಾಣಿಗಳನ್ನು ತಂದು, ದಿವಿ ನುಡು
ಕೂಡತ ಕ್ಷಿಪಿತ ಬಾಂಡವದಿ,
ಮಗ್ಗಾಡು ಬಳಿ 10 ಕಂಪೆಗಳ ಕಾಡು.
ಕ್ಷಿಪಿತ ಬಾಂಡವನು ಬಾಳು ಬಾಳು ಬಾಳು



ಶಿ ಕೃಷ್ಣಾಚಾರ್ಯ ವ್ಯಾಸಮೂರ್ತಿ

४३३४ २०८५

५८४४६०२५

ದಾವಣಗೆರೆ ತೃಪ್ತುಪ್ಪ.

Form 8000					
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ತುಂಗಾ ತೀರದ ಜನತೆಯ ಸಮಾವೇಶ, ಶಿವಮೊಗ್ಗ

ಸೆಪ್ಟೆಂಬರ್ 26 ಬೃಹತ್ ರ್ಯಾಲಿ
ಸೆಪ್ಟೆಂಬರ್ 27 ವಿಚಾರ ಸಂಕಿರಣ

ಪ್ರಿಯ ನಾಗರಿಕರೇ

ತುಂಗಾ ನದಿ ಹುಟ್ಟುವ ಗಂಗಡಿಕಲ್ಲು ಗುಡ್ಡದಲ್ಲಿ ಕಬ್ಬಿಣದ ಅದಿರು ತೆಗೆಯುವ ಯೋಜನೆಯನ್ನು ಆರಂಭಿಸಲು ಸರ್ಕಾರಗಳು ಉದ್ದೇಶಿಸಿವೆ. ಕುದುರೆಮುಖ ರಾಷ್ಟ್ರೀಯ ಆಭಯಾರಣ್ಯದ ಭಾಗವಾದ ಅಲ್ಲಿನ ಕಾಡನ್ನು ನಾಶಗೊಳಿಸಿ ಅಮೂಲ್ಯ ಸಸ್ಯ ಹಾಗೂ ಜೀವಸಂಕುಲಕ್ಕೆ ಅಪಾಯ ತಂದು, ವರಿಸರ ನಾಶ ಹಾಗೂ ಕೃಷಿ ಜೀವನಕ್ಕೆ ತೊಂದರೆಯುಂಟು ಮಾಡಲಿರುವ ಈ ಯೋಜನೆಯಿಂದ ಲಾಭ ಪಡೆಯುವುದು ಜಯಪ್ರಕಾಶ್ ಅಸೋಸಿಯೇಟ್ಸ್ ಎಂಬ ಬಹುರಾಷ್ಟ್ರೀಯ ಕಂಪನಿ.

ತುಂಗಾ ನದಿಯ ಉಳಿವಿಗೇ ಗಂಡಾಂತರಕಾರಿಯಾಗಿರುವ ಈ ಯೋಜನೆಯ ವಿರುದ್ಧ ಜನರಲ್ಲಿ ಒಕ್ಕೂಟ ಪ್ರತಿಭಟನೆ ಸೂಚಿಸಲು ಬನ್ನಿ.

ತುಂಗಾ ಮೂಲ ಉಳಿಸಿ ಸಮಾವೇಶಕ್ಕೆ ಸಾವಿರಾರು ಸಂಖ್ಯೆಯಲ್ಲಿ ಬನ್ನಿ.
ಕನ್ನಡ ನಾಡಿನ ನೆಲ ಜಲ ರಕ್ಷಣೆಗೆ ಹೋರಾಡ ಬನ್ನಿ

26ರಂದು ಬೆಳಿಗ್ಗೆ 11 ಗಂಟೆಗೆ
ಸಹ್ಯಾದ್ರಿ ಕಾಲೇಜಿನಿಂದ ಬೃಹತ್ ಮೆರವಣಿಗೆ

ಮೆರವಣಿಗೆ ಉದ್ಘಾಟನೆ : ಕೆ.ಟಿ.ಗಂಗಾಧರ್, ರೈತನಾಯಕರು

ಸಂಜೆ ನಾಲ್ಕು ಗಂಟೆಗೆ ಬಹಿರಂಗ ಸಭೆ ನಗರಸಭಾ ಆವರಣ, ಶಿವಮೊಗ್ಗ

ಮಾತನಾಡುವವರು : ಸುಂದರ್‌ಲಾಲ್ ಬಹುಗುಣ,
ಅಪ್ಪಿಕೋ ಚಳುವಳಿ ನೇತಾರರು ನವದೆಹಲಿ
ಪ್ರೊ|| ಎಂ.ಡಿ. ನಂಜುಂಡಸ್ವಾಮಿ,
ರಾಜ್ಯ ರೈತಸಂಘ
ಸುರೇಶ್‌ಹೆಬ್ಳಿಕರ್,
ಚಿತ್ರನಟರು
ಅಶೋಕ್,
ಕನ್ನಡ ದೇಶ
ಬಂಜಗರೆ ಜಯಪ್ರಕಾಶ್,
ಕರ್ನಾಟಕ ವಿಮೋಚನಾ ರಂಗ
ದೇವೇಂದ್ರಪ್ಪ,
ಪಿ.ವಿ.ಕೆ
ಕೆ.ವಿ.ಸುಬ್ಬಣ್ಣ
ನೀನಾಸಂ ಹೆಗ್ಗೋಡು

ಸೆಪ್ಟೆಂಬರ್ 27 ವಿಚಾರ ಸಂಕಿರಣ

ಸ್ಥಳ : ವೀರಶೈವ ಕಲ್ಯಾಣ ಮಂಟಪ ಶಿವಮೊಗ್ಗ

ಉದ್ಘಾಟನಾ ಗೋಷ್ಠಿ : ಬೆಳಿಗ್ಗೆ 10 ಗಂಟೆಗೆ

ಉದ್ಘಾಟನೆ: ತ್ಯಾನಂದೂರು ಪುಟ್ಟಣ್ಣ, ಮಲೆನಾಡಿನ ಹಿರಿಯ ನಾಗರಿಕ

ಅಧ್ಯಕ್ಷತೆ : ಕಡಿದಾಳು ಶಾಮಣ್ಣ, ರೈತ ನಾಯಕರು

ಪ್ರಸ್ತಾವನೆ : ಎಸ್. ಸುಂದರ್, ಕರ್ನಾಟಕ ವಿಮೋಚನಾ ರಂಗ

ಮೊದಲ ಗೋಷ್ಠಿ : ಬೆಳಿಗ್ಗೆ 11.30 ರಿಂದ 1.30

ಅಧ್ಯಕ್ಷತೆ : ಡಾ|| ಎ.ಎನ್.ನಾಗರಾಜ್, ವಿಜ್ಞಾನಿ, ಪರಿಸರ ಪೋರಾಟಗಾರರು

* ಪಶ್ಚಿಮ ಘಟ್ಟದಲ್ಲಿ ವಿನಾಶಕಾರಿ ಯೋಜನೆಗಳು

- ಬಿ.ಎಂ.ಕುಮಾರಸ್ವಾಮಿ, ರೀಡರ್ ಡಿ.ವಿ.ಎಸ್.ಕಾಲೇಜ್

* ಪ. ಘಟ್ಟದಲ್ಲಿ ತೆರೆದ ಗಣಿಗಾರಿಕೆಯಿಂದ ನದೀ ಪಾತ್ರದ ಮೇಲಾಗುವ ಪರಿಣಾಮಗಳು

- ಟಿ.ಎಸ್.ಚನ್ನೇಶ್, ಭಾರತೀಯ ವಿಜ್ಞಾನ ಸಂಸ್ಥೆ ಬೆಂಗಳೂರು

* ಗಂಗದಿಕಲ್ಲು ಗುಡ್ಡ ಅದಿರು ಯೋಜನೆಯ ಅಪಾಯಗಳು

- ಕಲ್ಕುಳಿ ವಿಠಲ್ ಹೆಗಡೆ, ಪತ್ರಕರ್ತರು ಕ.ವಿ.ರಂ. ಶೃಂಗೇರಿ

ಎರಡನೇ ಗೋಷ್ಠಿ : ಮಧ್ಯಾಹ್ನ 2.30 ರಿಂದ 5 ಗಂಟೆ

ಅಧ್ಯಕ್ಷತೆ : ಎಚ್.ಎಸ್.ದೊರೆಸ್ವಾಮಿ, ಸರ್ವೋದಯ ಮುಖಂಡರು

* ಬಹುರಾಷ್ಟ್ರೀಯ ಕಂಪನಿಗಳ ಕಪಿಮುಖ್ಯದಲ್ಲಿ ಜನರ ಆರೋಗ್ಯ ಹಾಗೂ ಪರಿಸರ

- ಡಾ|| ಗೋಪಾಲ ದಾಬಡೆ, ಕರ್ನಾಟಕ ಡ್ರಗ್ ಫೋರಮ್

* ಪ್ರವಾಸೋದ್ಯಮ : ಪರಿಸರ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಮೇಲಿನ ಪರಿಣಾಮಗಳು

- ಡಾ || ಕುಸುಮಾ ಸೊರಬ, ಪರಿಸರ ಪೋರಾಟಗಾರರು

* ಕರ್ನಾಟಕದಲ್ಲಿ ಹೆಚ್ಚುತ್ತಿರುವ ನಾಮ್ರಾಜ್ಯರಾಹಿ ಲೂಟಿ

- ಬಂಡಗೇರೆ ಜಯಪ್ರಕಾಶ್, ಕವಿ, ಅಧ್ಯಕ್ಷರು ಕ.ವಿ.ರಂ.

ಸರ್ವರಿಗೂ ಸ್ವಾಗತ

ತುಂಗಾ ಮೂಲ ಉಳಿಸಿ ಹೋರಾಟ ಚಕ್ರಾಟ



‘ತುಂಗಾ ಮೂಲ ಉಳಿಸಿ’ ಹೋರಾಟದ ಅಂಗವಾಗಿ ಕರ್ನಾಟಕ ವಿಮೋಚನಾ ರಂಗದ ಕಾರ್ಯಕರ್ತರು ಶೃಂಗೇರಿಯಿಂದ ಹರಿಹರದವರೆಗೆ ನಡೆದ ಸೈಕಲ್ ಜಾಥಾವು ಇತ್ತೀಚೆಗೆ ತೀರ್ಥಹಳ್ಳಿಯಲ್ಲಿ ಮೆರವಣಿಗೆ ನಡೆಯಿತು.

‘ತುಂಗಾ ಉಳಿಸಿ: ಬದುಕಲು ಬಿಡಿ’

ತೀರ್ಥಹಳ್ಳಿ, ಮೇ 14 - ‘ಸವಿಯಾದ ನೀರು ಕುಡಿದು, ಶುದ್ಧ ಗಾಳಿಯನ್ನು ಸೇವಿಸುತ್ತಾ ಸರ್ಕಾರದ ಯಾವುದೇ ಅಧುನಿಕ ಸವಲತ್ತುಗಳಿಲ್ಲದಿದ್ದರೂ ಬದುಕುತ್ತಿರುವ ನಮ್ಮನ್ನು ಬಹುರಾಷ್ಟ್ರೀಯ ಸಂಸ್ಥೆಗಳ ಕೈಗಾರಿಕಾ ಮಾಲಿನ್ಯಕ್ಕೆ ಅವಕಾಶ ನೀಡುವುದರ ಮೂಲಕ ನಮ್ಮದಿಗಿಡಿಸಬೇಡಿ’ ಎಂದು ತುಂಗಾ ಕಾಲೇಜಿನ ಉಪನ್ಯಾಸಕ ಯು. ಎಚ್. ಗಣೇಶ್ ಮನವಿ ಮಾಡಿದರು.

ಅವರು ಇತ್ತೀಚೆಗೆ ತೀರ್ಥಹಳ್ಳಿಯಲ್ಲಿ ನಡೆದ, ‘ತುಂಗಾ ಉಳಿಸಿ’ ಹೋರಾಟ ಜಾಥಾದವರು ವಿವರಿಸಿದ್ದ ಸಭೆಯಲ್ಲಿ ಮಾತನಾಡುತ್ತಿದ್ದರು.

ತುಂಗಾ ನದಿಯ ಮೂಲವಾದ ಶೃಂಗೇರಿಯ ಗಂಗಡಿಕಲ್ಲುಗುಡ್ಡದ ಅಭಯಾರಣ್ಯ ಪ್ರದೇಶದಲ್ಲಿ ವಿದೇಶಿ ಮೂಲದ ಜಯ

ಪ್ರಕಾಶ್ ಇಂಡಸ್ಟ್ರೀಸ್ ಎಂಬ ಬಹು ರಾಷ್ಟ್ರೀಯ ಸಂಸ್ಥೆಗೆ ಕಬ್ಬಿಣದ ಅದಿರು ತೆಗೆಯಲು ಸುಮಾರು ಎರಡೂವರೆ ಸಾವಿರ ಎಕರೆ ಪ್ರದೇಶಕ್ಕೆ ಕೇಂದ್ರ ಹಾಗೂ ರಾಜ್ಯ ಸರ್ಕಾರಗಳು ಪರವಾನಗಿ ನೀಡಿರುವುದರ ವಿರುದ್ಧ ‘ಕರ್ನಾಟಕ ವಿಮೋಚನಾ ರಂಗ’ ಹಾಗೂ ‘ತುಂಗಾ ಮೂಲ ಉಳಿಸಿ’ ಹೋರಾಟ ಸಮಿತಿಯವರು ಸಂಯುಕ್ತವಾಗಿ ಪ್ರತಿಭಟನಾ ಸಭೆ ವಿವರಿಸಿದ್ದರು.

ಕರ್ನಾಟಕವನ್ನು ಕೇಂದ್ರದ ಮಾಸತು ಎಂದು ಭಾವಿಸಿರುವ ಕೇಂದ್ರ ಸರ್ಕಾರ ಇಲ್ಲಿನ ನೆಲೆ-ಜಲವನ್ನು ತನಗಿವ್ವ ಬಂದಂತೆ ನಡೆಸಿಕೊಳ್ಳುತ್ತಿದೆ ಎಂದು ಆವಾದಿಸಿದ ಪರಿಸರವಾದಿ ಹಾಗೂ ಜಾಥಾ ಸಂಚಾಲಕ ಕಲ್ಕುಳಿ ವಿಠಲ ಹೆಗ್ಡೆ ಹೇಳಿದರು. ಇಲ್ಲಿ ಕಬ್ಬಿಣದ ಅದಿರು ತೆಗೆಯುವುದರಿಂದ

ತುಂಗಾ ಜಲಾನಯನ ಪ್ರದೇಶದ ನೂರಾರು ಹಳ್ಳಿ ಮತ್ತು ಪಟ್ಟಣಗಳಿಗೆ ಕುಡಿಯುವ ನೀರಿನ ಏಕೈಕ ಆಸರೆಯಾದ ತುಂಗಾ ಜಲವು ಕೊಳಕಾಗಿ ವಿಷಯುಕ್ತವಾಗುತ್ತದೆ. ಅದಿರನ್ನು ಸಂಸ್ಕರಿಸಿ ಉಳಿದ ಮಣ್ಣು ನದಿ ಪಾತ್ರದಲ್ಲಿ ತುಂಬಿ ಪ್ರವಾಹ ಬೆಳೆಪಾನಿಗಳಿಗೆ ಕಾರಣವಾಗುತ್ತದೆ. ಅಂತರ್ ಜಲ ಮೂಲಗಳು ಬತ್ತಿಹೋಗಿ ಇಲ್ಲಿನ ಇಡೀ ಪರಿಸರವೇ ಅಸ್ತವ್ಯಸ್ತವಾಗುವದೆಂದು ಅವರು ಎಚ್ಚರಿಸಿದರು.

ಸಭೆಯ ಅಧ್ಯಕ್ಷತೆಯನ್ನು ಡಾ.ಎ.ಎನ್. ನಾಗರಾಜ್ ವಹಿಸಿದ್ದರು. ಸಂಚಾಲಕ ಕೆಮ್ಮನೆ ರತ್ನಾಕರ್ ಸ್ವಾಗತಿಸಿದರು. ತಾಲ್ಲೂಕು ಪರಿಷತ್ - ಗಿರಿಜನ ಸಂಘದ ಅಧ್ಯಕ್ಷ ನಾರಾಯಣ ವಂದಿಸಿದರು.

ತುಂಗಾ ಮೂಲ ಉಳಿಸಿ ಹೋರಾಟ ಸಮಿತಿ, ತೀರ್ಥಹಳ್ಳಿ

ಜನಕರಂಜಿ ಸಂಘ ಮತ್ತು ಜನಜಾಗೃತಿ ಜಾಥಾ

ದಿನಾಂಕ : 9-7-2001 ನೇ ಸೋಮವಾರ ಸಮಯ : ಬೆಳಿಗ್ಗೆ 11-00 ಘಂಟೆಗೆ
ಬಹಿರಂಗ ಸಭೆಯು ನಡೆಯುವ ಸ್ಥಳ : ಗಾಯತ್ರಿ ಮಂದಿರ (ಪ್ರವಾಸ ಮಂದಿರದ ಎದುರು),
ಕುವೆಂಪು ರಸ್ತೆ, ತೀರ್ಥಹಳ್ಳಿ

ಪ್ರಸ್ತಾವನೆ : ಡಾ|| ಎ. ಎನ್. ನಾಗರಾಜ್, ಕೃಷಿ ವಿಜ್ಞಾನಿಗಳು
ಮುಖ್ಯ ಅತಿಥಿಗಳು : ಶ್ರೀ ಕಲ್ಯಾಣಿ ವಿಠಲ ಹೆಗ್ಡೆ, ವ್ಯಾಪಾರಿ ವರದಿಗಳು
ಅಧ್ಯಕ್ಷರು, ತುಂಗಾ-ಭದ್ರಾ ಉಳಿಸಿ ಹೋರಾಟ ಒಕ್ಕೂಟ
ಪ್ರೊ|| ಬಿ. ಎಂ. ಕುಮಾರಸ್ವಾಮಿ, ವರದಿಗಳು,
ಶ್ರೀಧರನಾಥರು, ಡಿ.ಎ.ಎಸ್. ಕಾಲೇಜ್, ಶಿವಮೊಗ್ಗ
ಶ್ರೀ ಕಡಿದಾಳ್ ಶಾಮಣ್ಣ, ರೈತ ಹೋರಾಟಗಾರರು
ತಾಲ್ಲೂಕಿನ ಜನತೆಯ ಪರವಾಗಿ
ಮಾತನಾಡುವ ಮಹೋದಯರು : ಶ್ರೀ ಆರಗ ಭಾನೀಂದ್ರ, ವಾಸಕರು, ತೀರ್ಥಹಳ್ಳಿ ಶ್ರೀ,
ಶ್ರೀ ಕೆಸ್ತೂರು ಮಂಜುನಾಥ್,
ಅಧ್ಯಕ್ಷರು, ತಾಲ್ಲೂಕು ಮಂಜುನಾಥ್ ತೀರ್ಥಹಳ್ಳಿ
ಅಧ್ಯಕ್ಷ : ಪದ್ಮಭೂಷಣ ಡಾ|| ಯು. ಆರ್. ಅನಂತಮೂರ್ತಿ,
ಭಾಸಕರ ಪ್ರಶಸ್ತಿ ವಿಜೇತ ಗಾಯತ್ರಿಗಳು

ಈ ಸಭೆಯಲ್ಲಿ ಶ್ರೀ ಕಡಿದಾಳ್ ದಿವಾಕರ್, ಶ್ರೀ ಪಟಮಕ್ಕಿ ರತ್ನಾಕರ್, ಶ್ರೀಕೆಮ್ಮನೆ ರತ್ನಾಕರ್, ಶ್ರೀ ಬಿ. ಬಿ. ಬಸವರಾಜು,
ಶ್ರೀಮತಿ ಗರ್ಗಾ ಪ್ರಭಾಕರ್ ಹಾಗೂ ಜಿಲ್ಲಾ ಪಂಚಾಯ್ತಿನ ಸದಸ್ಯರುಗಳಾದ ಶ್ರೀ ಪಟಮಕ್ಕಿ ಮಹಾಬಲೇಶ್, ಶ್ರೀ ಡಿ. ಲಕ್ಷ್ಮಣ್
ಮತ್ತು ಶ್ರೀಮತಿ ನೀಲಮ್ಮ ಸತೀಶ್ ಹಾಗೂ ತಾಲ್ಲೂಕು, ಗ್ರಾಮ ಪಂಚಾಯ್ತಿನ ಸದಸ್ಯರುಗಳು ಹಾಗೂ ಗ್ರಾಮ ಪಂಚಾಯತ್
ಒಕ್ಕೂಟದ ಅಧ್ಯಕ್ಷರಾದ ಶ್ರೀ ಗಾಬಳ ಶರಣೇಂದ್ರ ಹೆಗ್ಡೆ, ತಾಲ್ಲೂಕಿನ ಎಲ್ಲಾ ಸಂಘಸಂಸ್ಥೆಗಳ ವತಿಯಿಂದಿರುವವರು ಮತ್ತು ಸದಸ್ಯರುಗಳು
ಹಾಗೂ ಪುರಪಂಚಾಯತ್ ಸದಸ್ಯರು ಮತ್ತು ಎಲ್ಲಾ ಪ್ರಜ್ಞಾಪೂರ್ವಕ ಭಾಗವಹಿಸುತ್ತಾರೆ.

ಈ ಸಭೆಯ ನಂತರ ಪಟ್ಟಣದ ಮುಖ್ಯ ಮೀದಿನಲ್ಲಿ ಪಥಸಂಚಲನವನ್ನು ಕೊನೆಯಲ್ಲಿ ತೀರ್ಥಹಳ್ಳಿಯ ತಹಶೀಲ್ದಾರರ
ಮೂಲಕ ಕರ್ನಾಟಕ ಸರ್ಕಾರದ ಮುಖ್ಯಮಂತ್ರಿಗಳಿಗೆ ಮನವಿಯನ್ನು ಅರ್ಪಿಸಲಾಗುವುದು.

ತೀರ್ಥಹಳ್ಳಿ, 9-7-2001

ಎಲ್ಲರೂ ತಮ್ಮದೇ ಆದ ಈ ಕಾರ್ಯಕ್ರಮದಲ್ಲಿ ತಮ್ಮದೇ ಭಾಗವಹಿಸಬೇಕಾಗಿ ವಿನಂತಿ.

ಸಂಚಾಲಕರು,

ಶ್ರೀಮತಿ ಇಂದಿರಾ ಅರುಣಾಚಲ



AKSHARA GRANTHALAYA



ACC.NO. 049060

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